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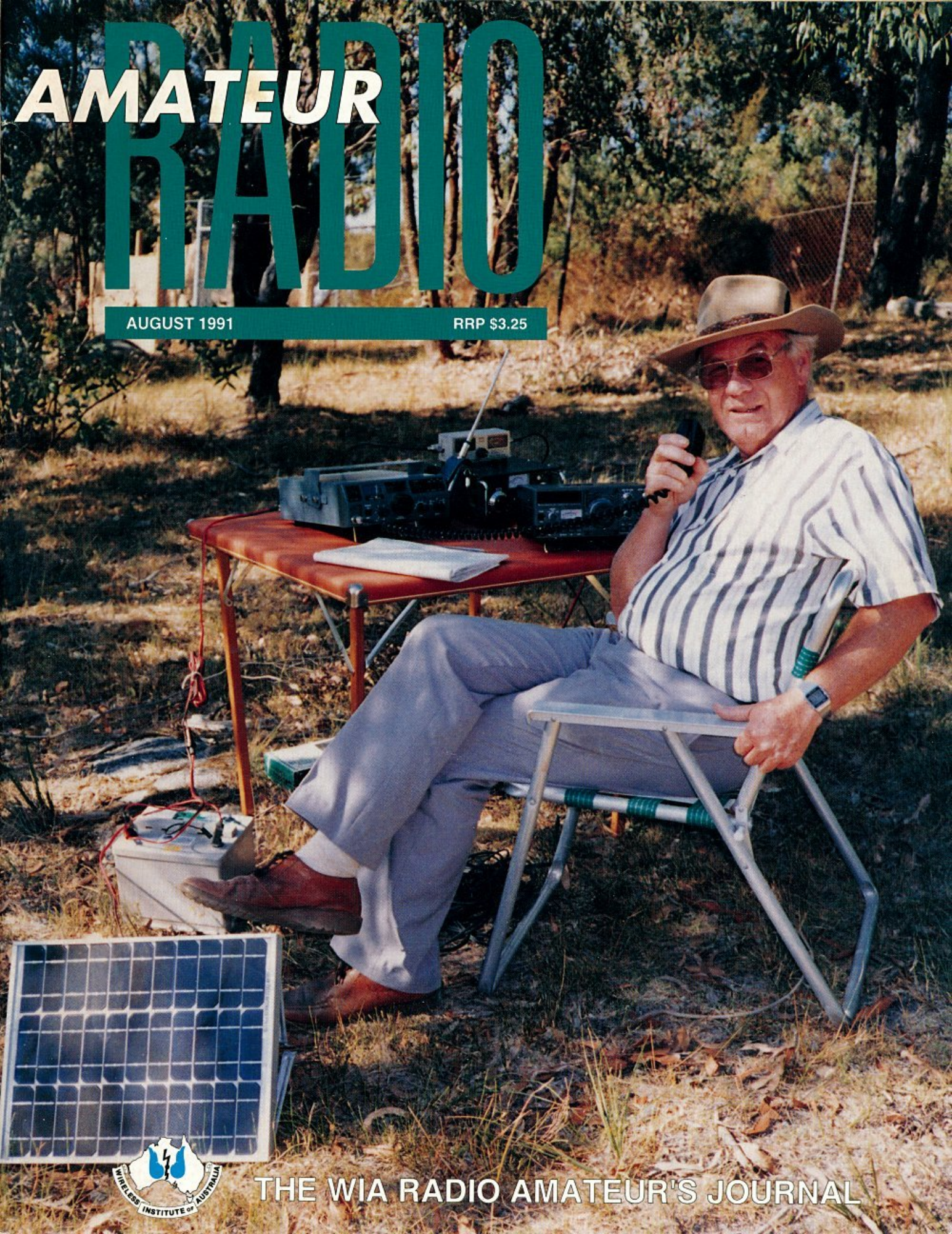

THE WIA RADIO AMATEUR'S JOURNAL

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AMATEUR RADIO

THE WIA RADIO AMATEUR'S JOURNAL

Vol 59 No 9 ISSN 0002-6859 August 1991

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Cover

The Compleat John Moyle contestant! Ron Fisher VK3OM comfortably in harmony with the birds and the bush. The rigs are Yaesu FT7 and Kenwood TS120V running about 12W. The "Rononymous" Z match is also represented feeding a 40m dipole fed with 300 ohm open wire line. The solar panel supplies about one amp charge to the battery. Photo by XYL Lynette Fisher.

EDITOR'S COMMENT

Graham Thornton VK3IY Managing Editor.

The very erudite Bill Rice VK3ABP is a hard act to follow in this column. He and XYL Margaret are currently enjoying a well-earned holiday touring VK4, 5 and 8. All sins found in this issue rest squarely on my shoulders!

Bill will be sorely missed at proof reading time. His eagle eye can spot a split infinitive at ten paces! My trouble is, I don't really know what a split infinitive is; I hope I don't use one here.

Our joint efforts are directed to giving you, the reader, the best possible magazine our resources will allow. We are conscious of the fact that it is YOUR magazine - not ours. It often faces comparison with commercial publications. This is comparing apples to oranges. They are free to adjust their content to maximise readership appeal; they can choose a market of their own. We can not.

AR is a membership journal and, as such, it must serve the needs of our members. Amateur radio, as a hobby, contains a wide divergence of interest, and our journal must cater for minority groups within it. It might perhaps be said that the magazine is the glue which holds the WIA together.

The most important person in the production of the magazine is the contributor. Without a constant supply of material, we would have nothing to publish. If it takes some time for your article to appear in print, please bear with us.

On reading the book QTC, recently reviewed in these pages, I was delighted to learn of my distant relationship to the late Gugliemo Marconi, via his first wife Beatrice. It's rather nice to let this drop occasionally, in the course of casual conversation! An Italian restaurant had to be patronised to learn the correct pronunciation of his first name.

I would like to express my thanks to all who give invaluable help in the production of the magazine.

Ron Fisher VK3OM and Jim Payne VK3AZT both travel considerable distances to help out on proof reading day.

Micki Horton, of *Magazine Graphics*, performs a skilful service with her magic fingers keying-in almost the entire text of the magazine; with her keen editorial eye, she has rescued us many times from our own oversights.

I am grateful to Bill Roper VK3ARZ and the Executive Office staff for their assistance and encouragement.

Vicki Griffin's excellent drawings would stand comparison with those of any other magazine.

Well, as Uncle Gugliemo used to say.....

73 for now.

ar

Gladesville/Aussat Tests

The third test transmission was scheduled for 24 July last.

For the remainder of this year tests have been scheduled for the end of September and November. Your local Divisional broadcasts will advise details.

Amateur Radio Service

A radiocommunication service for the purpose of self-training, intercommunication and technical investigations carried out by amateurs, that is, by duly authorised persons interested in radio technique solely with a personal aim and without pecuniary interest.

Wireless Institute of Australia

The world's first and oldest National Radio Society - Founded 1910

Representing the Australian Amateur Radio Service - Member of the International Amateur Radio Union

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WIA NEWS

FROM THE WIA EXECUTIVE OFFICE

WIA to Administer Amateur Exams

It is now some years since DoTC first discussed withdrawing from the administering of AOCP, LAOCP and NAOCP examinations. Members with long memories will recall discussions in the 1970s, proposals in 1984, and the costing of examinations in 1985 followed by the first concrete moves to devolvement in 1987.

Finally, in 1990, the devolvement of examinations became a reality and, in a number of places, examinations became a little more freely available. However, many of those who took on the tasks of administering the devolved examination system found it somewhat less than ideal and an increasing number of complaints began to be received by both DoTC and the WIA.

DoTC has now decided to substantially reduce its involvement in the day to day running of radio amateur examinations as from 31st December 1991, however, DoTC will still be responsible for granting exemptions, and providing and conducting examinations for persons having disabilities.

Negotiations between DoTC and the WIA have resulted in the WIA being granted permission to set and administer virtually all amateur radio examinations throughout Australia as from 1st October 1991 (this overlap is to allow an orderly phasing in of the new system and a phasing out of the old system). Understandably, DoTC will retain responsibility for the standard and content of amateur examinations, and will audit the management of the examinations by the WIA from time to time.

This is a major step for the WIA, and for the radio amateur service in Australia, but the new arrangement will solve many of the problems which have developed in the present system.

The philosophy, principles and mechanics of how the WIA will manage this new arrangement are still being finalised, and full details will be released in coming weeks.

Copies of *AR* articles

Photocopies of any article published in a back issue of *AR* available to members at $2.50 each (plus $2 00 for each additional issue in which the article appears)
AR Articles
PO Box 300
Caulfield South Vic 3162

WIA DIVISIONS

The WIA consists of seven autonomous State Divisions. Each member of the WIA is a member of a Division, usually their residential State or Territory, and each Division looks after amateur radio affairs within their State.

Division	Address	Officers			Weekly News Broadcasts	1991 Fees
VK1	ACT Division GPO Box 600 Canberra ACT 2601 Phone (06) 247 7006	President Secretary Treasurer	Christopher Davis Jan Burrell Ken Ray	VK1DO VK1BR VK1KEN	3.570 MHz 2m ch 6950 Rebroadcast Mondays 8pm 70cm ch 8525 2000 hrs Sun	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK2	NSW Division 109 Wigram St Parramatta NSW (PO Box 1066 Parramatta) 2124 Phone (02) 689 2417 Fax (02) 633 1525	President Secretary Treasurer (Office hours	Roger Henley Bob Lloyd-Jones Bob Taylor Mon-Fri 1100 - 1400 Wed 1900 - 2100)	VK2ZIG VK2YEL VK2AOE	From VK2WI at 1045 and 1915 on Sunday on the following frequencies and modes: (*1045 only): 1.845 AM; 3.595 AM morning and SSB evening; 7.146 AM*; 10.125 SSB; On relay 14.160 SSB* and 21.170 SSB; 28.320 SSB; 52.120 SSB; 52.525 FM; 144.120 SSB; 147.000 FM; 438.525 FM; On relay 584.750 ATV sound; 1281.750 FM. Plus automatic relays to 2m repeaters surrounding Sydney and manual to several country repeaters. News headlines by phone (02) 552 5188.	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK3	Victorian Division 38 Taylor St Ashburton Vic 3147 Phone (03) 885 9261	President Secretary Treasurer Office hours 0830-1530 Tue & Thur	Jim Linton Barry Wilton Rob Hailey	VK3PC VK3XV VK3XLZ	1.840 MHz AM, 3.615 SSB, 7.085 SSB, 147.250 FM(R) Mt Macedon, 147.225 FM(R) Mt Baw Baw 146.800 FM(R) Mildura, 438.075 FM(R) Mt St Leonard 1030 hrs on Sunday	(F) $69.00 (G) (S) $55.00 (X) $42.00
VK4	Queensland Division GPO Box 638 Brisbane Qld 4001 Phone (07) 284 9075	President Secretary Treasurer	John Aarsse Bob Lees Eric Fittock	VK4QA VK4ER VK4NEF	1.825, 3.605, 7.118, 10.135, 14.342, 18.132, 21.175, 24.970, 28.400, MHz 52.525 regional 2m repeaters and 1296.100 0900 hrs Sunday Repeated on 3.605 & 147.150 MHz, 1930 Monday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK5	South Australian Division 34 West Thebarton Rd Thebarton SA 5031 (GPO Box 1234 Adelaide SA 5001) Phone (08) 352 3428	President Secretary Treasurer	Rowland Bruce John McKellar Bill Wardrop	VK5OU VK5BJM VK5AWM	1820 kHz 3.550 MHz, 7.095, 14.175, 28.470, 53.100, 145.000, 147.000 FM(R) Adelaide, 146.700 FM(R) Mid North, 146.900 FM(R) South East, ATV Ch 34 579.00 Adelaide, ATV 444.250 Mid North Barossa Valley 146.825, 438.425 (NT)3.555, 146.500, 0900 hrs Sunday	(F) $67.50 (G) (S) $54.00 (X) $40.50
VK6	West Australian Division PO Box 10 West Perth WA 6872 Phone (09) 388 3888	President Secretary Treasurer	Cliff Bastin John Farnan Bruce Hedland - Thomas	VK6LZ VK6AFA VK6OO	146.700 FM(R) Perth, at 0930 hrs Sunday, relayed on 3.560, 7.075, 14.115,14.175, 21.185, 28.345, 50.150, 438.525 MHz Country relays 3582, 147.350(R) Busselton 146.900(R) Mt William (Bunbury)147.225(R) 147.250 (R) Mt Saddleback 146.725(R) Albany 146.825(R) Mt Barker Broadcast repeated on 3.560 at 1930 hrs.	(F) $59.00 (G) (S) $47.50 (X) $32.00
VK7	Tasmanian Division 148 Derwent Ave Lindisfarne TAS 7015	President Secretary Treasurer	Tom Allen Ted Beard Peter King	VK7AL VK7EB VK7ZPK	146.700 MHz FM (VK7RHT) at 0930 hrs Sunday relayed on 147.000 (VK7RAA), 146.750 (VK7RNW), 3.570, 7.090, 14.130, 52.100, 144.100 (Hobart) Repeated Tues 3.590 at 1930 hrs	(F) $65.00 (G) (S) $52.00 (X) $38.00
VK8	(Northern Territory) is part of the VK5 Division and relays broadcasts from VK5 as shown (received on 14 or 28 MHz).					

Note: All times are local. All frequencies MHz.

Membership Grades
Full (F) Pension (G)
Needy (G) Student (S)
Non receipt of AR (X)

Three year membership available to (F) (G) (X) grades at fee x 3 times

However, the main features will be:

* WIA Exam Service, operating from the WIA Executive Office in Melbourne, will promptly provide quality, consistent standard examination materials to accredited examiners anywhere in Australia to enable them to conduct examinations as required.
* Any team of two licensed radio amateurs, or other responsible members of the community, regardless of whether or not they are members of the WIA, will be able to become accredited examiners. Amongst other things, the eligibility of other responsible members of the community to conduct exams should enable most candidates in remote towns to sit exams locally even though no radio amateurs are available.
* No prior advice to WIA Exam Service as to the time and place of an exam will be required, except under exceptional circumstances. This means that, as soon as the examinations material is received from WIA Exam Service, the examination could be conducted at any time mutually convenient to the accredited examiner team and the candidate(s).
* Candidates will be allowed five or ten minutes, depending on the particular examination, to read the examination paper immediately prior to commencement of the examination.
* Accredited examiners will be able to correct examinations immediately they are finished, and hand results in writing to the candidates. Naturally, for Morse sending examinations this will apply only where an examiner has the appropriate Morse qualification. All Morse sending exams will be tape recorded.
* Certificates of examination passes, which will be accepted by DoTC for issuing of Amateur Certificates of Proficiency or confirmation of fail marks, will be mailed to the successful exam candidates by WIA Exam Service within days after the exam.
* Costs of exams from WIA Exam Service will be minimised and will be based on a realistic cost-recovery basis. Accredited examiners will be able to set their own examination fees to candidates, over and above the WIA Exam Service basic cost.
* The WIA will immediately begin work on revising the present question banks, and substantially increasing the number and range of questions.

US Technician Licence

A brief note from the ARRL newsletter for 30th May 1991 states that since the codeless Technician class licence was born on February 14th more than four thousand new United States of America amateurs have qualified for this new class of licence.

50 MHz Input Required

The Chairman of FTAC, John Martin VK3ZJC, highlighted in his notes in the July 1991 issue of Amateur Radio magazine, the need for input to the Federal review of 50 MHz beacon policy. Active beacon users and others interested in 50 MHz are urged to read John's comments and drop him a line as soon as possible stating their ideas.

Remembrance Day Contest

Yes! It's that time again. The 1991 Remembrance Day contest will take place over the weekend of 17th - 18th August. Full details and rules appear in the Contests pages of this issue of Amateur Radio magazine. Please note that this year there is a change to the requirement for submitting logs. Only a summary sheet is needed.

RF Tag Identification (RFID) Systems

For some time the WIA has been in communication with DoTC about the proliferation of these devices and their potential to cause interference to other spectrum users. As a result of WIA submissions a permitted maximum operating field strength of the radiated signal has been established.

A recent letter from Mr G. Hutchins, Director Spectrum Planning Section of DoTC assures us that the Department is considering the overall management of these devices. His letter included the following:

Low-powered devices must operate on a no interference, no protection basis. A low powered device that causes interference to any primary, permitted or secondary service will be required to cease operation immediately. In addition, operators of a low powered device must accept interference from other users.

as well as:

The Department does not intend to develop a low powered device standard. The regulatory measures proposed and those already in place will collectively meet the objective of a standard, viz to control the potential of these devices to interfere with other users of the spectrum.

New DXCC Country

The addition of the Penguin Islands to the DX Century Club list brings the total to 323 "countries". The Penguins are a group of thirteen islands situated off the coast of the west African country of Namibia, and claimed by South Africa. There have been two recent operations from these islands, in July 1990 and in December 1990.

1992 Australian Radio Amateur Call Book

The Executive Office of the WIA is preparing for a busy season with the run up to the publication of this new edition of the Call Book. Members can help reduce the load a little by ensuring that all the information held here is correct and in the desired format.

If you were dissatisfied with your listing last year, now is the time to notify the office of your correct details. The information about members is taken from the WIA membership records, but for non-members the only information we have is what comes from DoTC, so please check with DoTC that they have the records correct.

Any requests for suppression of addresses or names MUST come to the Executive office in writing.

Each year after the Call Book is published we receive letters from readers notifying us of changed callsigns, or deceased amateurs of which we have not been informed, or of typographical errors that have slipped through. If any of those assiduous readers wish to contribute to the accuracy of the publication by helping with the proofreading BEFORE the final printing, they will be most welcome.

A telephone offer to the office will allow us to notify you when the proofs are available for checking.

Amateur Radio Magazine

A magazine such as *Amateur Radio* carries a range of articles that do not always fit neatly into a page or half page. Most readers will have noted that there are occasional spaces of a few lines that are "filled" as necessary. These spaces make ideal spots for

business card size advertisements, and the editorial staff are always happy to receive such advertising.

However, they could also be used for short hints, comments or ideas from members. If you have a favourite short cut, building hint or operating practice that can be explained in a few lines, the Editors would like to hear about it, and many members may be interested to try it.

Co-operation With NZART

Over the weekend of 31st May - 3rd June 1991 Ron Henderson VK1RH and Brenda Edmonds VK3KT, representing the WIA, attended the New Zealand Annual Conference as guests of NZART. Ron's report to Executive will be available from Divisional Councillors on request, and Brenda has reported briefly in the Education Notes on the aspects of education, examinations and devolvement in New Zealand in comparison with Australia.

Both WIA delegates noted the similarities in the issues raised - membership drives, funding, corporate planning, and Morse code to name a few - although some of these problem solving methods differed. It was agreed that there are many projects on which the two societies can share both the work loads and the benefits. The WIA and the delegates would like to express their thanks to NZART for their hospitality, the warm welcome and the open discussion on a wide range of topics.

Quarterly Federal Meetings

July 20 and 21 see the first quarterly meeting of Executive and the Federal Council since the Annual Convention. Special items on the Agenda include a draft submission on examination protocol, an assessment of the DoTC Regulations, which is to be undertaken at the suggestion of DoTC in an attempt to increase the deregulation of the amateur service, and FTAC submissions on repeater licence conditions and usage of 50 MHz.

The outcome of these meetings will be reported in future Federal News Tapes and Amateur Radio magazine WIANEWS columns.

DOC 70, 71 & 72 Are No More

The regulations' brochures DOC 70, 71 and 72 have again been reprinted by DoTC, but this time will be known as RIB 70, 71 and 72. The RIB stands for Radiocommunications Information Brochure.

DoTC Investigates

Items relating to usage of amateur bands by non-authorised services are often reported to the WIA by members. Two such instances have occurred lately. Two separate correspondents notified the Executive Office of a Western Australian fishing fleet base station operating on 3796 kHz USB. Consultation with DoTC revealed that the station had originally been issued with that frequency in error, but the licence had later been cancelled and a new one issued in the 4 MHz band, with a short change-over time allowed. As this time has now expired, the licensee will be contacted to remind him of his now illegal operations.

Another correspondent recently brought to our attention an advertising brochure showing an irrigation sensor claimed to transmit on 29.1 MHz. This was also mentioned in a letter published in "Over to You" in the June 1991 issue of Amateur Radio magazine.

The matter was raised with DoTC late in May. The response received from the Manager Licensing, David Hunt states:-

"We have investigated the matter and it appears to be simply a misprint in the brochure. The device involved has a type approval certificate (copy attached) and actually operates on 29.71 MHz. The company which sells the device has reprinted the brochure and removed the reference to operating frequency."

Amateur Radio Address Labels

In the March 1990 issue of Amateur Radio magazine, it was explained how to read the information on the address label of your mailed copy of the magazine. Since then, we have found that there was some confusion among those members who had paid three-year subscriptions. Our computer experts have now succeeded in reorganising the information so that the month and year when the renewal falls due are now shown.

The top line of your address label now reads, from left to right, month/year of renewal, WIA Division, Grade of membership, callsign or listener number, and date of that issue of the magazine. Here is an example:

04/92 3F VK3XYZ 234567 0791

This label top line shows that WIA membership is due for renewal on the 1st April 1992, the addressee is a member of the Victorian Division, holding a full grade of membership, with the callsign VK3XYZ, and a membership computer database number of 234567, and this label is to address delivery of the July 1991 issue of Amateur Radio magazine.

Please note that the computer database number is different from the one that appears on your WIA membership certificate. On this line of information, the first number will change after your renewal is received, and the last number will change with each magazine issue.

Please also remember that any changes in your address or callsign information should be notified to the Executive Office as soon as possible, preferably on the appropriate section of the fly-sheet.

EMI Standards

The June 1991 issue of "The Australian Standard", an official publication of Standards Australia, announces that:-

"Standards Australia has published a new edition of the Standard (AS1044) which deals with electromagnetic interference from household appliances. This new standard differs entirely from the early Australian philosophy and is identical to the international Standard (IEC/CISPR 14). Australia's electromagnetic interference (EMI) Standards are now all completely aligned with the corresponding IEC/CISPR publications, the only variations being those essential to Australian conditions, eg protection of air navigation frequencies not used by other countries."

The same issue notes the preparation of an Interim Standard for electronic ballasts, including those associated with the new generation compact fluorescent lamps, reflecting the revised harmonic current limits.

Australian Science in Schools Week

The Executive Office has recently received inspection copies of the newly released booklet "Communication", which has been produced by the Australian Science Teachers Association as the basis for the annual "Science in Schools Week", to be held this year from 19th - 23rd August.

The booklet provides ideas for experimentation and investigation by students at upper primary or secondary level. It covers a creditable range of communication methods including, of course, radio, television and satellites (although it does put Morse code in the chapter titled "Communication using wires").

This information is passed on, partly to give credit for a local production, but mainly because it advises students to invite amateur radio operators to visit schools, or to contact the WIA and radio clubs for information. So be prepared for a rush of inquiries in mid August. I am sure you will be as helpful as possible.

Some clubs or amateurs, knowing about the project, may like to take the initiative and contact the schools first. Names and addresses of State Co-ordinators of the Science in Schools Week can be obtained from the Executive Office.

WICEN Needs New Operators

Even though one in sixteen licensed amateurs in Australia belongs to the Wireless Institute Civil Emergency Net (WICEN) more are needed. WICEN especially needs to find competent, practising amateurs in country towns and in the more isolated places and remote areas of this large country.

The recent spate of floods in NSW and Queensland proved yet again how much WICEN is needed, but the response time was slow because WICEN had little or no contact information on amateurs in the affected areas. Belonging to WICEN is not a large financial burden and the training is very easy. This training is more to familiarise you with what the other services will do rather than on radio and technique.

WICEN needs people who are prepared to put in to assist their Community in times of need. Do you fit this description?

If you can help or would like further information please contact your WICEN Co-ordinator through your WIA Division, or join in on any of the Divisional WICEN broadcasts. Further information is also available from the WICEN BBS on (03) 802 0913.

Sign up a new WIA member today - use the form on the reverse of the *AR* address flysheet

More TVI Potential?

A quote from the DoTc Newsletter of June 1991 reads:-

"The 35th year of television in Australia has seen the number of television transmitters pass the 1000 mark. As well as the well-recognised main station transmitters, which serve major population centres, the number includes translator stations which make television services available to people in areas beyond the coverage of the main stations."

Reciprocal Licensing in Japan

A recent letter from the Japanese Amateur Radio League (JARL) advises of increased application fees for the amateur service, as follows:

Initial applications:
10 watts or less
11,300 Yen
More than 10 watts, but 50 watts or less
14,300 Yen
More than 50 watts, but 100 watts or less
21,600 Yen
Renewal.
3,650 Yen

The idea of paying according to the power rating is an interesting concept.

When seeking a reciprocal licence in Japan, amateurs are advised to apply through the JARL, who will translate the documents and submit the application to the licensing authority. Further information is available from the WIA Executive office.

International Representation Fund

Donations to this important fund received and not previously publicly acknowledged by the WIA include those from:

Paul Clutter
Adelaide Hills Amateur Radio Society
Ron Churcher VK7RN
R. K. Howrie VK6ANR
M. G. McCulloch VK2BMZ

In this time of very high expenses for international representation of the amateur service in Australia, the WIA extends its thanks to all contributors.

New Award

A letter from the VK3 Midland Amateur Radio Club announces the establishment of their new Golden Triangle Award. The award Net is run on a Thursday night on 3580 kHz at 8 pm local time, the Net Controller being Judy VK3NYL.

In order to achieve the award, it is necessary to work at least 25 towns within the Midland Amateur Radio Zone. A list of the towns is available on receipt of an 8" x 5" SASE from *"The Awards Manager, Ron D. Mitchell, VK3JNR, C/ o PO, Malmsbury, VIC. 3446."*

US Proposals for WARC 92

The ARRL Newsletter of 27th June 1991 lists the Federal Communications Commission (FCC), the USA equivalent of the Australian DoTC, recommendations for the US proposals for the 1992 WARC.

In summary, the proposals include movement of the amateur allocation in the 40 metre band and expansion of the HF broadcasting bands with the phasing out of AM in favour of reduced-carrier SSB.

The FCC did not support the reduction of amateur allocations in the 80 and 40 metre bands, or the re-allocation of the 420 - 421 MHz band for use by low-earth-orbiting mobile satellites. There are also proposals for variations in the 2300-2450 MHz band.

Amateur Radio for the Olympic Games?

The same newsletter noted that the organisers of the World Radio Sports Federation (WRSF) are planning an international program of on-site radiosport competitions. Rules are being established and national and local organisations are being encouraged to develop such events. Ideas and proposals are welcomed, and inquiries may be directed to John Crovelli W2GD, 200 Woolf Rd., Milford, NJ 08848, USA.

VNG 16 MHz Time Change

Marion Leiba VK1VNG has advised that the VNG time and frequency service transmitting on 16.000 MHz has changed its times of operating. Transmission on this frequency now takes place from 2200 to 1000 UTC daily.

The other VNG transmissions on 5.000, 8.638 and 12.984 MHz remain transmitting continuously.

Speech identification by Graham Conolly VK2BL takes place on the 5.000 and 16.000 MHz transmissions only during the 15th, 30th, 45th and 60 minutes of each hour. These recorded speech announcements are *"notched"* to ensure that the second markers can still be heard. **ar**

"Handybridge" Impedance Bridge for HF

DREW DIAMOND VK3XU
"NAR MEIAN" GATTERS RD
WONGA PARK 3115

OFTEN THE RADIO AMATEUR or experimenter will need to know the value of an impedance, especially in antenna and feedline work. A signal source (TX) and SWR meter can only show deviation from the working impedance (usually 50 ohms) in terms of SWR, and gives little idea as to the actual value of the impedance.

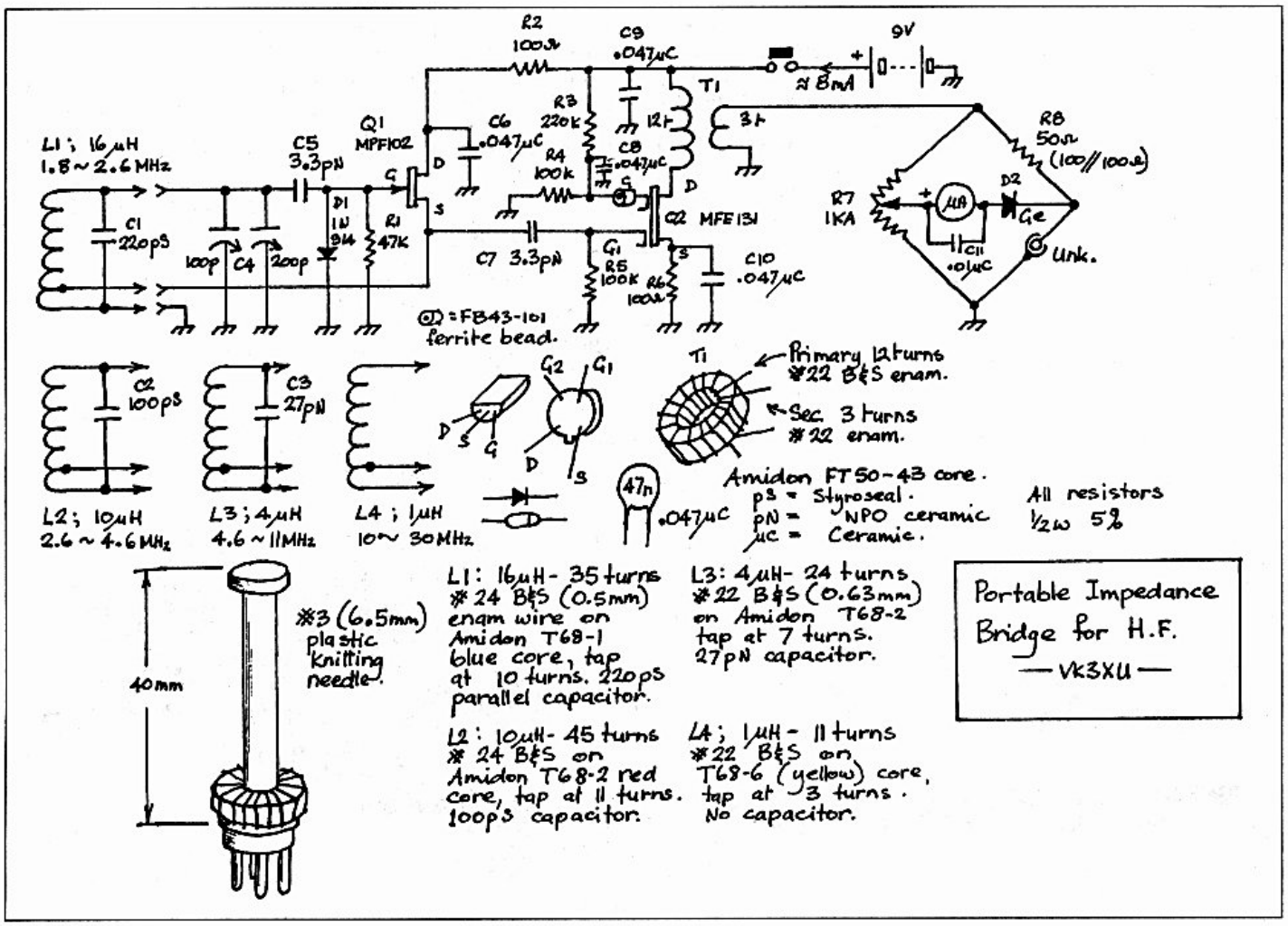
This bridge has at least three functions; it can measure resistive impedances from about 10 ohms to 600 ohms over 1.8 to 30MHz, provide an HF oscillator signal source, and can be used to find the value of small coils and capacitors. For convenience, the signal source is built-in, so the need for a separate oscillator is avoided. It is hoped that the following arrangement will provide easier measurements, particularly in awkward or remote applications.

All parts are available at present. A deliberate choice was made to use ordinary tag strip, larger components and aluminium box construction to stimulate those enthusiasts who are perhaps discouraged by projects which use a printed circuit board and tiny components.

Circuit

The measuring element is based upon the classic and oft-used Wheatstone bridge. When the 1000-ohm linear pot R7 is at mid-travel, and the unknown (UNK) connector is terminated with a 50-ohm resistive impedance, the circuit will be "in balance" and no potential exists across the detector. Values other than 50 ohms will cause balance at differing positions along the travel of the pot, and may be read or interpolated after suitable calibration.

The signal is supplied from a Hartley oscillator maintained by Q1, an N-channel junction FET, then buffered and amplified by Q2, a dual-channel MOSFET. Broadband transformer T1 converts the



high-impedance output at the drain of Q2 to a low-impedance source to drive the bridge circuit.

Frequency band changing is accomplished with a set of four plug-in toroidal coils to cover 1.8 to 30MHz. Bandswitching was tried, but bothersome dips and peaks were caused by resonances with unused coil/capacitor combinations in close proximity. The usual way of tackling the problem is to short out any unused coils but would require a special switch of a kind not readily available. To avoid excessive frequency variations, the coils are plugged into a socket mounted within the box, thus shielding the coil from hand capacity and air draughts.

Construction

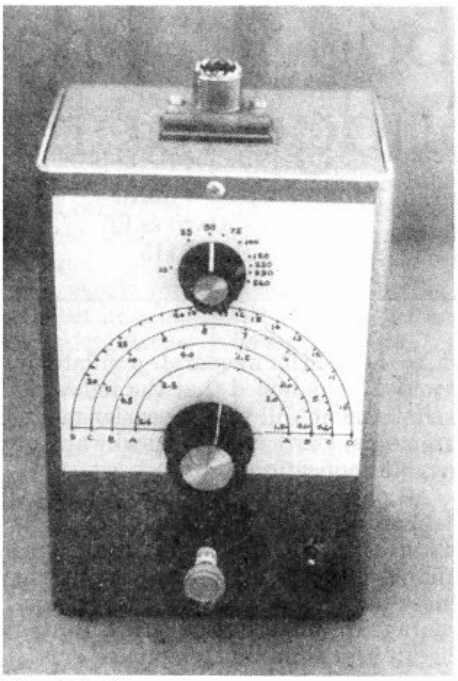
The box shown housing the bridge is a Horwood number 34/6/DS measuring 100mm x 155mm x 75mm. In order to accommodate a reduction drive for the variable capacitor, a small "sub-chassis" is fitted inside the box as shown. This approach also permits short leads in the Wheatstone circuit, and the aforesaid coil arrangement.

The photo shows a suggested wiring method using tag strips. Most electronics shops can supply these. Lead lengths should be as short as is reasonably practicable.

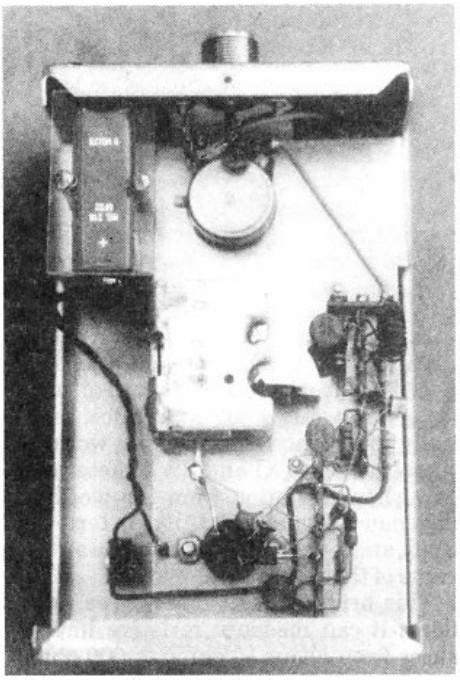
The capacitor should be connected to the reduction drive with a flexible coupler. These are impossible to buy new. A fair substitute is to fit a short length of 0.25" i.d. rubber fuel hose connected with fuel filter clips as shown.

Make sure your 1K pot for R7 has a good length of shaft, as there are some dinky little pots around which will not suit this project. Perhaps a scheme similar to the capacitor coupler may be used for a pot with too short a shaft.

The four-pin plugs for the coils are called line or speaker plugs in catalogues. The centre hole (or fifth pin) should be drilled out to take a 1/8Wh or 6BA or 3mm RH screw. Cut 40mm from the tops of four #3 plastic knitting needles. Drill and tap a 1/8Wh (or 6BA etc) hole in the bottom of each.



Handybridge



Component Locations

Wind the toroidal coils exactly as specified, leaving about 40mm of free wire for terminating into the plugs. When winding, as you reach the tap point, pull out about 10mm of wire and twist into a little pigtail loop. It will probably be easier for you to solder a wire onto the loop rather than try to get a loop into one of the pins. As each coils is fitted onto the assembly, do not forget to include the appropriate capacitor. It should be possible to fit the coil wire and capacitor lead into the pin. The coils may be glued on with epoxy cement later when the oscillator is proved working, and the frequency ranges confirmed. The cement will lower the frequency about 0.08 per cent.

The ferrite bead on gate 2 of Q2 is necessary to prevent parasitic oscillation in this stage. It may be held in position with a small bead of wax.

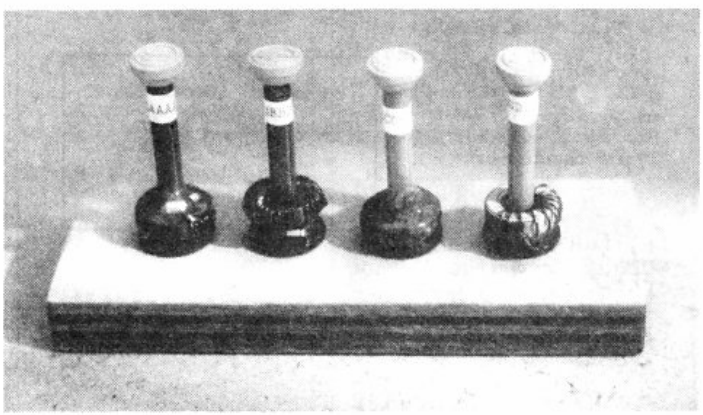
Any small meter of about 200 or 250uAdc will suit the detector. Those commonly available marked "signal" or "tune" are of this sensitivity.

Calibration

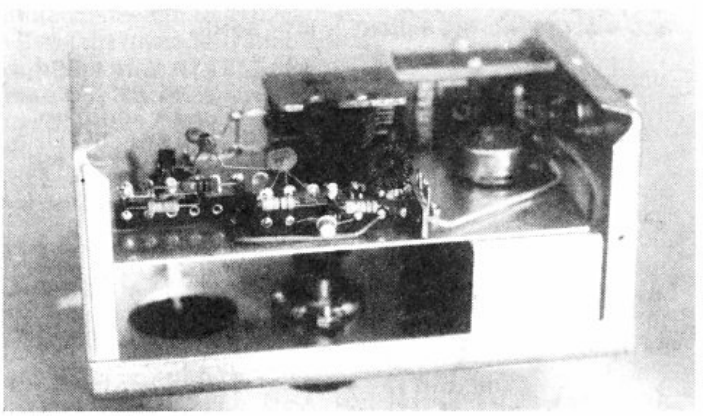
The frequency and impedance scales for the prototype are marked upon a rectangle of firm glossy cardboard with holes cut out for the drive and pot, and held in position with double-sided tape. Before fitting the cardboard, scribe four arcs for the frequency ranges using a fine black pen and compass. They may be labelled ABCD and keyed to the corresponding coils.

If a frequency counter is available, connect the UNK to the counter input and check that each range is generated, with perhaps a small overlap for each. Capacitors F1-C3 may need to be altered

(Continued on Page 9)



Coil Set



Side View

The VK Caltenna

(A CONTINUOUS COVERAGE, 0.1MHz TO 30MHz DUMMY LOAD ANTENNA)

CLIVE COOK VK4CC
PO BOX 161
BRIBIE ISLAND 4507

LIKE MANY OTHERS, I HAVE experienced the thrill and, frequently, the frustration arising from homebrewing, antennas especially, to the extent that a grand total of 46 20m rotary beam have come and gone through my hands, worthy of a book in its own right, I suppose. Nevertheless, despite that interest in gain antennas, I have always been mindful of the need for a simple unity gain antenna which might provide for all-band or even continuous coverage operation. For rapid frequency changing, it is of immense importance that the need for an antenna tuning unit be dispensed with, if possible, to cater for current "leapfrogging" communication techniques.

My first venture into that field was with my discovery that several dipoles could be connected to a common feedline, as explained in the February 1957 edition of *Amateur Radio,* and repeated in the October 1987 edition of *AR.*

An indication of the difficulty in achieving broadband coverage was clearly given by Jerry Hall in the April 1983 edition of *QST.* In his search for a simple broadband 80m dipole, he tested a total of 14 different designs. The best he could manage was a mere 50kHz bandwidth between the 2:1 VSWR points, and this was with a multi-wire cage type.

Now, I'm no wine buff, but surely 1983 must have been a good wine year because, not only was it the year of Jerry Hall's findings, but it was also the year in which I was granted patent rights on an antenna, since marketed as the Black CTW (Coaxial Travelling Wave) antenna. It was also the year in which an eminent Australian communications engineer of the time, the late Ross Treharne, described essentials for broadbanding of antennas in the *Journal of the Electrical and Electronics Engineering Association of Australia,* Vol 3, No 2. Treharne outlined several types of broadband antennas then in use, including shortcomings, not the least of which was erratic VSWR.

Treharne expressed the opinion that, to be truly broadband, an antenna must, in his word, be MONOCARPIC, meaning that energy could be applied once only to an antenna structure, after which any unradiated energy should either be resistively absorbed for conversion to heat energy, or partitioned off and bled to other sections of the antenna. He also held the view that if an antenna could be designed to more accurately match to the impedance of freespace - 120ohms, it would have greater radiation efficiency.

During my more recent experiments, I recalled that I have seen advertisements in US radio journals for passive HF antenna matching units capable of energising practically any length of wire. Prices range from about $600 to $1000, depending on power requirement. For $600 you get a 300-watt PEP unit, so read on, you might save yourself a few dollars, as it is likely that the VK CALTENNA is of similar design but with a better SWR capability.

Lewis McCoy of *CQ* editorial fame was once confronted with a home-brew version of one of those devices and, after later tests, published his findings in the May 1985 edition of *CQ.* Unlike the VK CALTENNA, he did not use a step-up or even a 1:1 matching transformer. He simply connected a 50-ohm resistor at the end of 50-ohm transmission line and joined various lengths of wire to the resistor terminals. He was impressed with results, but generally the dummy load antenna was two points down on a reference antenna. He did suggest wires of

(Continued overleaf)

Handybridge Impedance Bridge for HF

(Continued From page 8)

to provide some overlap if desired. When each range is satisfactorily confirmed, cement the coils as described above.

Mark salient frequencies upon the scale. Do not try to crowd in copious calibration points, as interpolation will provide any missing information.

No counter? Listen for the generator signal on a general coverage receiver. A screwdriver blade inserted into the UNK connector should radiate enough signal to be heard.

Now for the impedance scale. Check that at least half-scale deflection is obtained on the meter (the gain of the buffer amp may be varied by changing the value of R3; increase R3 for lower stage gain).

Obtain a range of small carbon resistors including (say) 10, 27, 51 (or two parallel 100 ohms), 75 (parallel 150 ohms), 100, 150, 220, 330 and 560 ohms. Set the oscillator to 14MHz ad connect the 50-ohm resistor, using a coax connector to suit. You should obtain a null at mid range of R7. Mark this on the scale. Do the same for all desired impedances between 10 and 600 ohms.

Using the Bridge

At this point you may be interested in trying an experimer.t. Connect a coax-fed antenna to the bridge. Set the impedance knob to what is supposed to be the impedance at the station end (eg 50 ohms). Now vary the frequency around the "antenna frequency". How does it look? You may find that the antenna gives 50 ohms at some higher or lower frequency than always supposed. Try checking for 50 ohms at higher frequencies. It is perhaps surprising just how many frequencies will yield 50 ohms resistive.

An impedance with significant reactive component will not allow a really good null to be obtained, so keep this in mind with any measurements.

The oscillator may also be used on the test bench as a generator to supply a few milliwatts at the UNK connector.

To measure coils and capacitors, connect the combination IN SERIES across the UNK connector. As the impedance of a series circuit is low at resonance, set the impedance pot to near zero (or perhaps a bit higher, if the needle is pinning). Now sweep the oscillator around the estimated frequency of the combination. The meter will dip at resonance. It should then be possible to set the impedance pot near zero and obtain a really sharp null. All recent ARRL handbooks have a chart and formula for applying this technique, making use of a standard coil and capacitor of 5mH and 100pF respectively. See also Ref 4.

Problems

There are no perceived pitfalls for the typical constructor. If, however, you have trouble in locating any of the parts, or

(Continued Page 50)

several lengths be used. This is something which might be worthwhile in the VK CALTENNA. He also suggested that it might be capable of being used in directional gain antennas.

An Operational Version

At the moment, I use a 33ft (10m) sleeved aluminium tubing vertical supplied by Black Products Engineering of Brisbane. It sits on a heavy rubber insulating mat and is guyed with polyester ropes tied to a fence and the house. A copper-clad earth spike has been hammered into the ground at the base of the antenna for electrostatic discharge purposes. It does not have any function in the performance of the antenna, neither are radials used or needed.

The actual matching unit consists of a 4:1 step-up transformer trifilar wound with a second winding across which is connected a 50-ohm non-inductive resistor. (See figures 1 and 2).

The choice of a step-up transformer was made using an early idea of Collins Radio wherein the design took into consideration the likely geometrical mean impedance of a random length of wire one quarter wavelength long or more being calculated by the formula - A = B * C where: A equals the geometrical mean impedance of the wire in ohms, B equals the likely impedance of the wire in ohms at a current node (a current minima), and C equals the likely impedance in ohms of the wire at a current loop (a current maxima). Thus, assuming 1200 ohms at the current node, and 50 ohms at a current loop, the resultant from the formula is 245 ohms. This is near enough for practical purposes to my selection of 200 ohms, which seems to work quite well.

With full legal power, a 30-watt resistor has not yet disintegrated, so 50 watts should be an ideal choice for our legal power.

The 50-ohm 30-watt resistor which I use was imported from Japan and, as this might be difficult for others to obtain, I have obtained a 50-watt wire-wound non-inductive resistor, made in Australia, from the manufacturer's agent, St Lucia Electronics of Brisbane, for testing. I have mounted the transformer and resistor in an aluminium box sealed with gasket rubber cement against moisture. Two terminals and an earth wire connecting nut and bolt are incorporated in construction, giving me the option of either end-feeding or centre-feeding an antenna.

I tried to obtain satisfactory results with a transformer wound in the "unbalanced-to-unbalanced" configuration as per Fig 1, without success. Therefore it will be seen that the final choice was of an "unbalanced-to-balanced" configuration as per Fig 2. In one way this is an advantage, as it has enabled me to construct a suitable matching unit for use either as a vertical antenna energiser or for use in centre-feeding a dipole. An eyelet bolt is screwed to the box for that use.

Since this article was written, however, tests undertaken for me by VK2BO have shown that SWR and performance are adversely affected if the VK CALTENNA is operated as either a centre or offset-fed dipole. Best results have been obtained by end feeding, with one end of the transformer left "floating" when using the configuration of Fig 2. The optimum length has been found to be between 32.3m and 36.5m. The wire may also be oriented as an end-fed inverted vee.

I suppose the sceptics are preparing to shoot me down for daring to waste power in a resistor. In reply I can only say that no apparent difference in performance could be observed by several ZL stations I worked when I changed the VK CALTENNA into a conventional quarter-wave Marconi vertical worked against ground on 7MHz. The latter was very much mismatched on other bands, especially on 20 metres, where the base impedance would be expected to be high.

My resolve to intentionally waste some power in that resistor was, as was the objective, to obtain a broadband capability with acceptable loss of applied power.

The 33ft (10m) vertical performs well for me with the SWR being so low that visitors have been tempted to hit the glass of my Oskerblock SWR meter. I have shown them that a Yaesu SWR meter has similar readings to the extent also, of quickly showing the high reading with the feedline disconnected. Readings obtained are as shown in figure 3. A quality antenna impedance bridge verifies that an impedance of practically 50 ohms applies throughout the range of the instrument (1.8 to 35MHz). I am also able to receive numerous M/F homing beacons operating below our broadcast band and can receive every broadcast station within 150 miles (200km) of my station in daylight hours.

JA5AI, who recently stayed with me for several weeks, intends replacing the driven element of his tribander with a VK CALTENNA to provide for rotary dipole action on bands not catered for in the maker's beam design. He started a mini JA-VK contest using his VK4CHH callsign ... you could see he could speak a common language for the JA DXCC SSB seekers. Therefore the VK CALTENNA certainly had a severe workout without causing the 30-watt resistor to disintegrate with up to five hours operation a time.

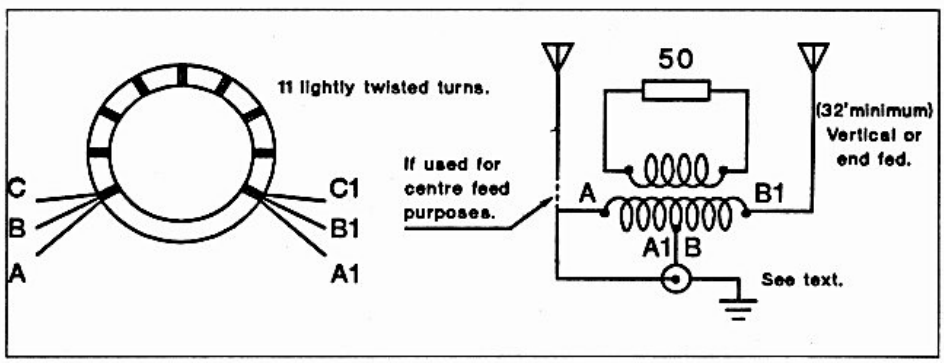


Figure 1. (Inefficient)

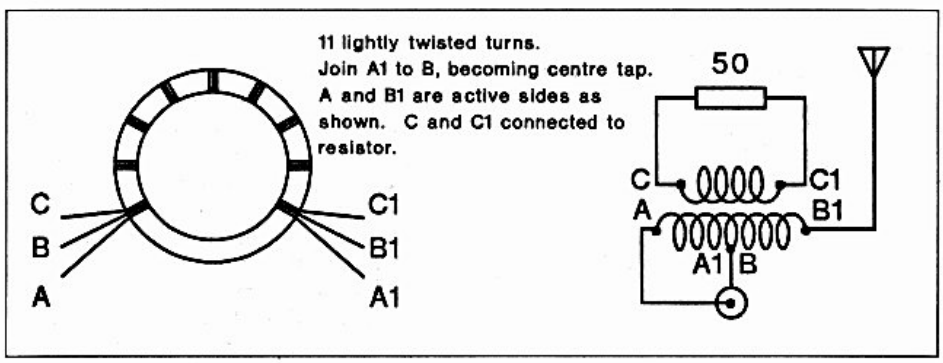


Figure 2. As used on 33 foot vertical.

... and now some additional information

I originally stated that for end-feeding or base-feeding I would have preferred to have employed the "unbalanced-to-unbalanced" toroidal transformer configuration but had not been satisfied with results because of the erratic SWR from band to band. However, I have since overcome the problem by increasing the number of twisted turns from 11 to a total of 22 turns, as shown in Fig 4.

Furthermore, although the original design made use of a 50-ohm non-inductive resistor by using a trifilar winding, I have found that equally satisfactory results may be obtained by the use of a 200-ohm non-inductive resistor in conjunction with a bifilar winding, as shown in Fig 5. A total of 22 turns is still used in this instance, but it should be remembered that windings should be twisted together very loosely to avoid high interwiring capacitive leakage losses at the higher frequencies.

It has been noted that an Australian agent is offering 50-ohm 300-watt non-inductive resistors for only a few dollars. In my case, using a TS430S, no damage has resulted to 30-watt resistors of both types.

For end-feeding a random length of wire, I have had to confine my experiments to an inverted vee, a sloper with some wire stretched off at right angles, and to a 33ft (10m) high aluminium tubing vertical. In all cases, for better all-round performance, from both the communication and SWR point of view, it has been found best NOT to use any earth, radials or counterpoise, all of which have been tried with the vertical antenna and, in part with the inverted vee.

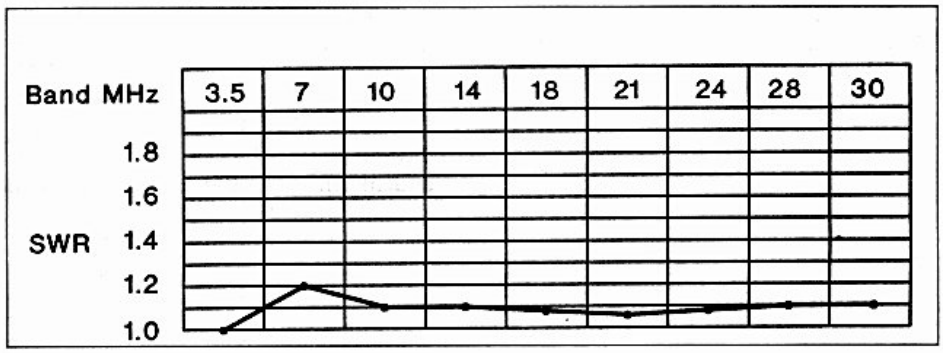


Figure 3 SWR readings obtained using 33 foot vertical.

Earthing the "cold" side of the transformer, other than per the feedline in the shack, results in a horrible mismatch of any length of antenna near that of one quarter wave in length and, to a lesser extent, odd multiples thereof. For example, this results in an SWR of about 2:1 when I use my vertical antenna on 7MHz. Without any earth etc, as stated, SWR is little different from, for example, on 14MHz, where the antenna is then high impedance at the base, being then one halfwave long.

If one uses the "unbalanced-to-unbalanced" transfer configuration SWR will be highest if, for example, it is connected for centre feeding a half-wave dipole. Consequently aim for a length of wire which will be nearer to 3/4 wave long than 1/2 wave long. For all-band operation I found that 51ft (16m) was satisfactory. For end-feeding I suggest experiments with lengths from 90ft (30m) to 110ft (36m).

In all instances, I found that the longer lengths of wire provided for as much as four or more S points on the bands 3.5 and 1.8MHz in comparison to the 30ft (10m) vertical. From 7MHz and higher, the vertical antenna was the better all-round performer, with no directivity problems as with the horizontal types.

I have undertaken experiments using a reflector on 21MHz with the vertical antenna with some very interesting and encouraging results.

I would be grateful for any reports of experiments undertaken with one or more of the variations of the VK CALTENNA, especially if integrated in any beam configuration.

Depending on the response to this I may be unable to personally answer correspondence for which I hope I will be forgiven. Nevertheless, I will gladly discuss matters on air if required, so if you seek a reply, specify date, time and frequency, with alternatives in case I am away holidaying at the time, please.

The name VK CALTENNA? I will leave that for you to put together, VK of course being the country of its origin.

I found that the word CALTENNA was so freely used in the flowing vowel-constant wordage of the Japanese language by JA5AI/VK5CHH in his speech that it seems a good choice for that reason alone. Do not be surprised if you soon contact a JA using one.

ar

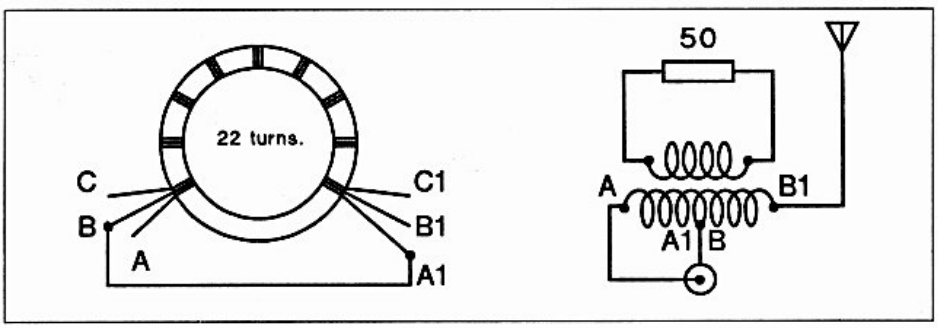


Figure 4. Modified balun

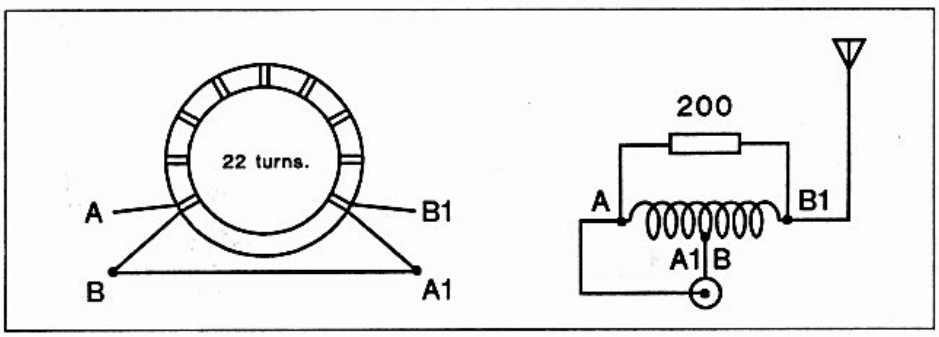


Figure 5. Alternative arrangement using 200 ohms

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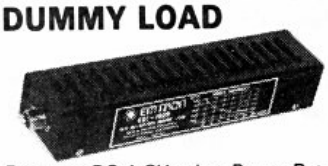

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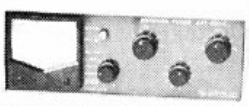

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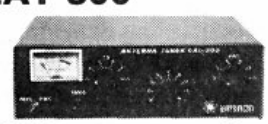

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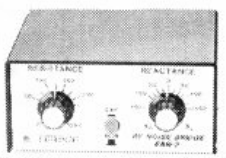

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Propagation of Long Radio Waves (3)

THE MAIN STORY

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(CONTINUED FROM JULY ISSUE)

Introduction

AT LAST WE COME TO THE purpose of the article. Most of the information in this section came from a book, *"VLF Radio Engineering"* by A D Watt who, in turn, obtained information from many publications by J R Wait. Some information was obtained from *"Ionospheric Radio Propagation"* by K Davis, and a small amount of information from practical experience by the author.

Much of the information given by Watt is literally intended to cover VLF, that is 10 to 30kHz. A certain amount of extrapolation is required to extend the range to the "higher" low frequencies. The methods given in Watt for path loss calculations are based on theory from a knowledge of the physical nature of the propagation paths and processes. Davis gives largely empirical results to calculate path loss, and these seem to depart from those of Watt in some respects. This will be discussed later in the article. It would appear that the general theory of low frequency given by Watt can be applied to frequencies up to 200kHz.

In reading this section, put most of what you know about the ionosphere out of your mind. You will find that low-frequency propagation is quite different.

Before going too far, it should be pointed out that all low-frequency transmissions are vertically polarised only. In fact, it is almost impossible to radiate any horizontal component unless you are transmitting from an aeroplane. Radiation of vertical polarisation was referred to in an earlier article (Ref 3). Some horizontal component can exist in the received signal, and this will be discussed later.

Because the experimental licence issued to several people in Australia was for operation on 196kHz (Ref 3) most of the calculations will centre around this frequency.

Surface Wave Propagation

By now most readers should be fairly familiar with this. At LF, ground loss is very low, and at all low frequencies, propagation can be of significance over distances of up to 500 to 1000km even over poor ground. Although surface wave propagation is dependent on the fairly basic physical phenomenon of diffraction described in section 1, the calculation of path loss depends upon a number of factors. In the words of texts on the subjects, it is easier to calculate path loss from graphs given for the purpose. Graphs for calculating surface wave loss are given in most texts on propagation. For the purpose of discussion, path loss graphs are given here for 200kHz and 1.8MHz (see figure 4).

At all radio frequencies, the surface wave is composed of several components. The most significant waves are direct, reflected and a wave derived from the edge of the wave shadow as described above under diffraction. At LF, the direct and reflected wave (Ref 4) at low angle to the ground are phase inverted, resulting in total cancellation. This leaves only the diffracted wave as the dominant wave. The effect of this is that, as energy is lost from the wave at ground level, wave paths above the loss area tend to bend down to fill in the gap. This bending also affects sky wave propagation, and this will be referred to again in the next section. These characteristics are shown in the general LF propagation diagram figure 5 and in an exaggerated form in figure 6.

Close to the transmitter energy is lost from the surface wave mainly due to induced currents in the lossy ground. Further from the transmitter, in the earth shadow zone, energy is lost as signal energy is fed into the gap. See figure 6. At low frequencies ground losses are low and become lower with decreasing frequency. Also at low frequencies the waves themselves are bigger. This is purely a matter of scale; big waves fill up big gaps better than small waves.

On the practical side, it is obvious from the curves (figure 4) that at 196kHz surface wave propagation is excellent, especially over seawater. For comparison, surface wave propagation is shown for 1.8MHz. This propagation is so good and completely reliable that this factor alone makes LF operation desirable. From the graph it can be seen that a 196kHz surface wave over poor ground can travel up to five times as far as a 1.8MHz wave under the same conditions. When reading this propagation graph please keep in mind that the distance scale is logarithmic.

Ionospheric Propagation

This section will deal with this subject in several basic sections, and at the end it is possible to estimate any path loss as shown in the worked examples.

The Structure of the Ionosphere as Seen at LF

Firstly we will look at the ionosphere

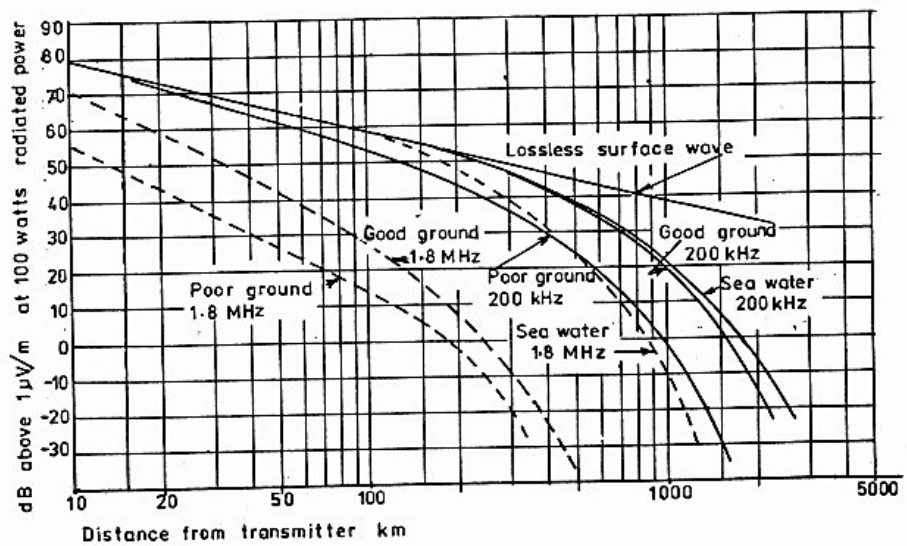

Figure 4. Surface wave propagation, 1.8MHz and 200kHz

without the earth's magnetic field. The upper ionosphere consists mainly of electrons and ionised particles. The atmosphere consists mainly of molecules with few free electrons. Loss in the ionosphere is a function of collision frequency between electrons and molecules. Where the atmosphere and ionosphere meet, a layer is formed which has a high electron collision frequency and, therefore, high loss. This lossy layer, referred to as the conducting layer, contrary to popular belief, is always present. In the daytime it is thick and exists at about 70km above the earth. At night the ionisation in the lower ionosphere is much less and the conducting layer is much thinner and exists at about 90km.

The lossy or conductive layer is like a resistive film across the bottom of the ionosphere. It exists in the region we call the D layer. The D layer can exist as a layer of ionisation but, more usually, it is simply the bottom of the E layer.

At high frequency, the D region is lossy in the daytime and basically prevents long-distance communications below about 10MHz. At night the lossy layer has little effect on high-frequency propagation, at least above 6MHz. Electrons in the ionosphere oscillate as an electromagnetic wave passes through. At low frequencies, electrons move further as each wave passes, causing more collisions. At these frequencies the whole ionosphere becomes lossy to passing waves. The loss is particularly high in the lossy or conductive layer. The D region has no maximum usable frequency in the same way as the E and F layers. The high loss renders it non-refractive and, under normal circumstances, low-frequency waves do not propagate through the ionosphere.

When electrons move through the earth's magnetic field the electrons are caused to spiral. This oscillation of the electrons of the ionosphere resonates at a frequency known as the *"gyro"* frequency. In south-eastern Australia this frequency is around 1.8MHz. The general effect is that it causes some unusual propagation near these frequencies caused by different reflections. That is, reflections at other angles than normal can be emphasised.

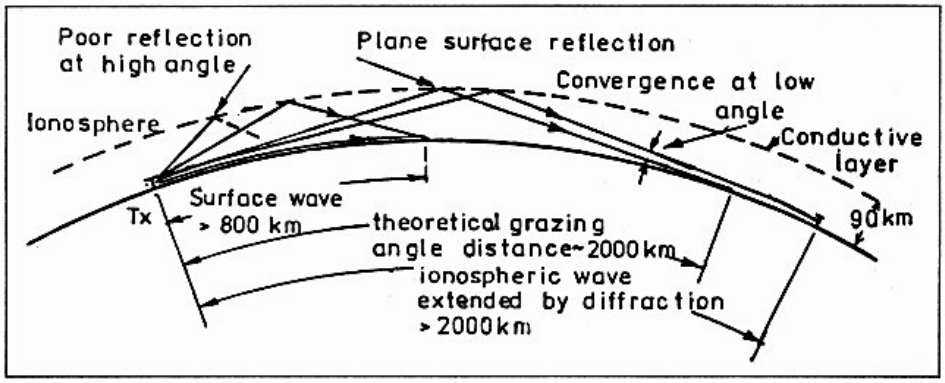

Figure 5. LF night-time propagation paths.

It is a popular misconception that loss in the ionosphere is maximum at the gyro frequency. This is not correct. The texts on the subject state that loss in the ionosphere due to the earth's magnetic field is lower than expected at HF and LF, and higher at or near the gyro frequency. This results in a knee point in the curve of loss/frequency (not shown here) of the conductive layer, but the loss certainly increases with decreasing frequency. There is a second knee or flattening off in the curve at the collision frequency of the electrons and this is around 400kHz at night.

Reflection by the Ionosphere at Low Frequency

With such a lossy ionosphere, how can any reflection take place? Actually an LF signal does not enter the ionosphere at all, but is reflected by the bottom surface. This is plane surface reflection or regular reflection as described above under "basics of propagation". It occurs at the bottom edge of the ionosphere when the conductivity increases with height significantly over a distance of a wavelength. This reflective power of the ionosphere at the bottom edge discontinuity is the same as reflection by the surface of the ground at the discontinuity between the atmosphere and ground.

To return to the optical analogy for LF, the ground and the ionosphere would both appear like sheets of glass with partly silvered surfaces. The top side of the ground and the under side of the ionosphere would poorly reflect light in our analogy perpendicular to the surface, but be quite good reflectors at a low angle to the surface.

The rate of change of conductivity with height of the ionosphere (conductivity profile) is expressed in terms of vertical distance in kilometres ($l1$) over which the conductivity changes by the ratio 2.71:1. For satisfactory reflection at LF the value of this distance, $l1$ is between 0.5 and 3.5km, depending upon the time of day and time of the year. From this value a reflection coefficient can be obtained. The reflection plane is taken as the point where the conductivity equals $1.11 \times 10^{-10} f$ and at 196kHz this equals 2.18×10^{-5} Siemen/metre.

In many ways, this plane surface reflection is much simpler than the type of reflection which occurs at HF. It was known to the ancients. When radio signals were first transmitted across the Atlantic, they exclaimed that there must be a conducting layer of some sort in the sky. The conducting layer behaved exactly as expected with improving reflection coefficient with increasing wavelength. It was this knowledge which brought about the idea that wavelengths shorter than 200m were useless. A statement which amateurs never allow the professionals to forget. Realistically, it did not

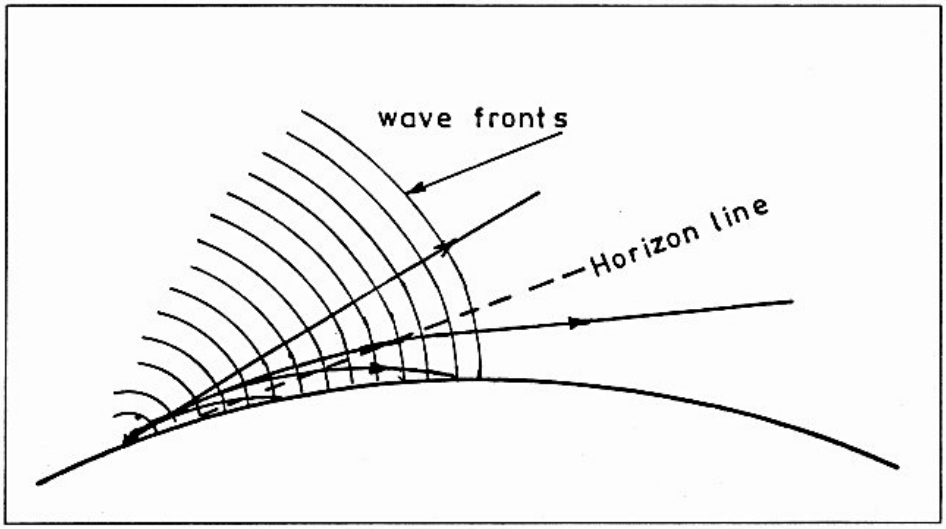

Figure 6. Exaggerated diagram showing bending of wave paths to form surface wave and bending of low angle ray to have a virtual angle below the horizon.

take them long to find out about the true nature of the ionosphere, and between 1920 and 1930 most of what we know now was discovered.

This type of ionospheric reflection which occurs at LF has a number of unique characteristics which are different from that at HF.

1. Since the reflection coefficient is dependent upon the change of conductivity over the distance of a wavelength, the longer the wavelength, or the lower the frequency, the better the reflection down to 10kHz. The reflection loss is minimum at between 10 and 30kHz. Below this frequency, the conductive layer does not have enough thickness or conductivity to maintain reflection. In other words, the first factor of conductivity profile is the limiting factor at the higher frequency end of the LF spectrum, and the second factor of actual conductivity is the limiting factor at the lower frequency end of the LF spectrum. This results in a unique form of ionospheric reflection in the LF band that is different from that in any other part of the radio spectrum.
2. Reflection by this mode is best at the lowest angle and falls off with increasing angle. This is opposite of the situation at the lower high frequencies and medium frequencies where loss is higher at lower angles.
3. Although the ionisation in this region is very low at night, the reflection coefficient is considerably improved at low frequencies, simply because the discontinuity is much sharper and occurs at an increased height. This results in a paradoxical observation that the lower the ionisation the better the reflection. At HF the opposite is true.

Figure 7 gives a graph of reflection coefficient expressed as loss in dB against frequency. The straight line sections of the graphs are based on the formula:

$$20 \log R = .57 f l_1 \cos i \quad (7)$$

where 20log R is the reflection coefficient loss in dB, l_1 is defined above, f is frequency in kilohertz, i is the angle of incidence at the ionosphere and R is the reflection coefficient for vertical to vertical polarisation. As with HF, a certain amount of the signal is converted into the opposite polarisation, but this is not detailed here. It will be noted that the log of the reflection loss in dB is simply proportional to the other factors. The vertical scale of the graph is, therefore, double log. For a particular frequency and l_1, the loss in dB is proportional to cos i. The graph is correct for a cos i=0.16. This is roughly the cos of the incident angle for a

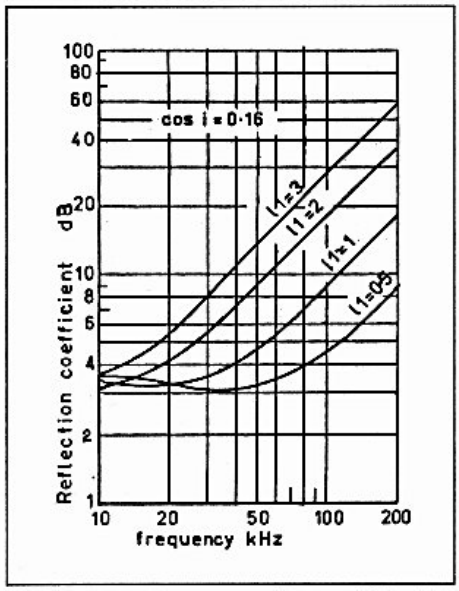

Figure 7. Reflection coefficient 20 log|R|.

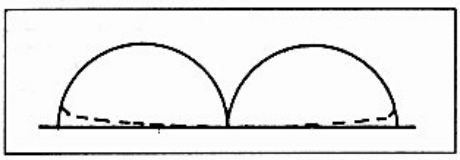

Figure 8. Simplified diagram showing cutback.

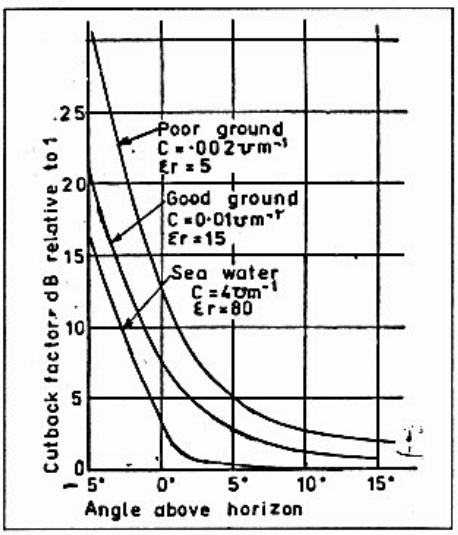

Figure 9. Cutback factor for short vertical monopole at 200kHz.

grazing launching ray. For loss at other angles:

Loss dB=Loss from graph x cos i/0.16. (8)

The value of l_1 is variable, depending upon time of day and year (the sunspot cycle appears to have little effect). The value of l_1 is usually from .8 to 1.2 at night and from 2 to 3 at midday. In the daytime the value of l_1 varies from the night-time value at dawn in a curve peaking at midday. Another significant point to keep in mind is that the height of the reflecting plane is 90km at night and drops quite rapidly to 70 to 75km with daylight. From some actual values taken from observed results at 200kHz and for cos i=0.16 given in Wait, values of 20log|R| are as follows: Night — 12.5, Winter day — 29, and summer day — 48 to 60. These correspond to values of l_1 of 0.7, 1.7 and 2.6 to 3 respectively. These are the values which were used for the calculations and accompanying graphs.

Cut-Back Factor and Convergence

These two effects on the received signal strength tend to be complementary and are, therefore, both dealt with in this section.

The radiation pattern for the distant field remote from the ground from a short vertical antenna is shown by the solid lines in figure 8. Since the field strength from a short vertical antenna is proportional to the cosine of the angle to the antenna, then the field strength radiation pattern graph, when plotted on a polar diagram, will consist of semi-circles as shown. The gain of a short dipole is 1.78dBi (1.78dB relative to an isotropic) at right angles to the wire. If the antenna is above a perfect ground, the lower half of the radiated energy will be added to the upper half, and this adds another 3dB. In normal operation on long waves the antenna is always vertical and always short, and, therefore, the gain is always 4.78dBi or three times.

A simple example to clarify this is as follows. The power to an antenna is 100W and the antenna is 1 per cent efficient the equivalent radiated power at right angles to the wire is:

100x0.01x3=3W

Due to losses of the signal to the ground and to supplying the surface wave by diffraction, the lower edge of the radiation pattern is depleted as shown by the dotted line in figure 8. This depletion is well known at HF and is described in all the usual amateur texts on the subject of radiation. At HF, it usually means there is virtually no useful sky wave signal originating from an antenna, either vertical or horizontal at an angle less than 5° to the ground. This characteristic of loss of signal to the ground is known as *cutback*.

At LF, cutback is less than at HF. In fact, as a result of bending of low-angle signals due to diffraction to produce the surface wave, the sky wave path just above is also bent, resulting in radiation at a virtual angle below the horizon. This is also illustrated in figures 5 and 6. Refraction in the lower layers of air also has the effect of extending the horizon at LF in the same way as at HF.

Useful radiation can be expected for a

sky wave path when the wave path originates from the antenna at an angle of -5° and this is enhanced by convergence described below. This results in a considerable extension of the single hop sky wave path, and helps to compensate for the very low height of the reflecting layer. For an ionospheric reflecting layer 90km high, the expected maximum length of a single hop sky wave is about 2000km, but, with the enhancements described, the hop can be usefully extended to more than 2800km.

The graphs for cutback factor at 200kHz derived from information given in Wait are shown in figure 9.

Convergence is a focusing effect and is illustrated in figure 5. Normally signal path rays diverge, but because the reflecting surface is curved, signal path rays are caused to converge at low radiation angles. The gain resulting from convergence at 200kHz is shown in the graph in figure 10. The gain is particularly significant for signal paths just below the horizon, and significantly compensates for cutback. The gain is higher for the second and subsequent hops (not shown here).

Convergence not only takes place in the vertical plane, but also in the horizontal plane resulting from the curvature of the earth. To take the effect to its ultimate conclusion (under ideal conditions), an image of the transmitting antenna is formed at the opposite side of the earth (antipodal position) from the transmitter.

Because of much higher cutback at HF, low-angle convergence in the vertical plane would have little effect. The author has no knowledge of this effect being taken into account in HF calculations.

Reflection From the Earth's Surface After Two or More Hops

How far a low-frequency signal will travel depends very much on the power used and the frequency. At 196kHz, and with amateur power levels and antenna efficiencies, hops much beyond the first would be unusual. If a high-efficiency system is used, multi-hop signal is a possibility and, therefore, ground reflection must be taken into account.

Ground loss at LF is very low. On multi-hop signals ionospheric reflection is likely to be the limiting factor. Loss for ground-reflected signals was originally described by Terman (Ref 5) and has been duplicated in almost every textbook on the subject of propagation. It is not proposed to reproduce a ground reflection loss graph here. The reader can refer to the many texts on the subject.

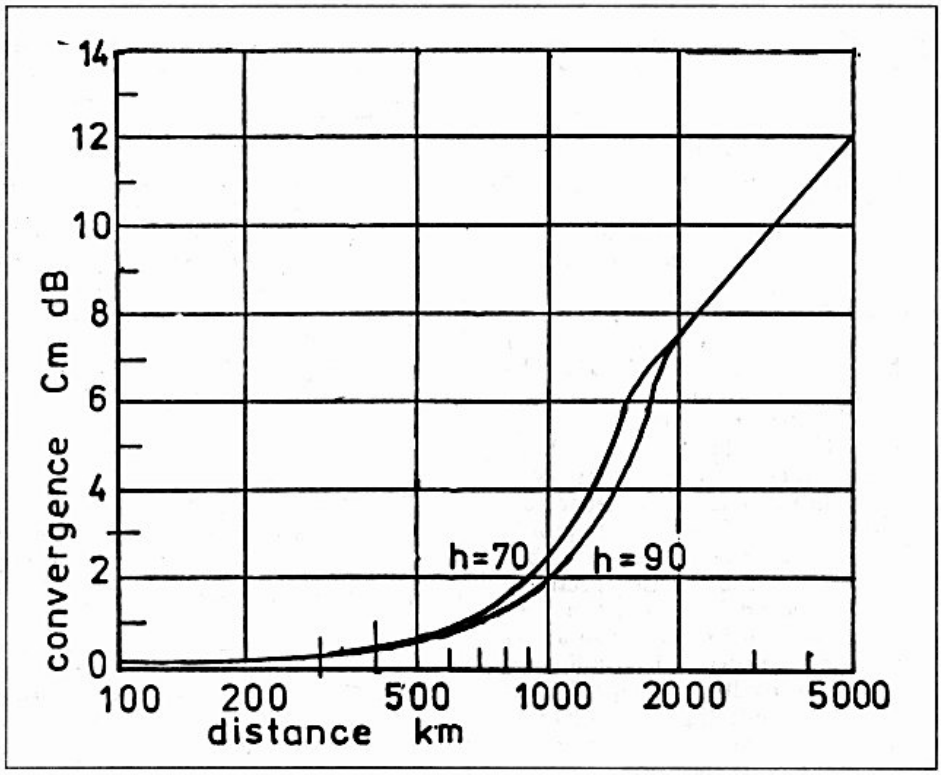

Figure 10. Convergence factor at 200kHz.

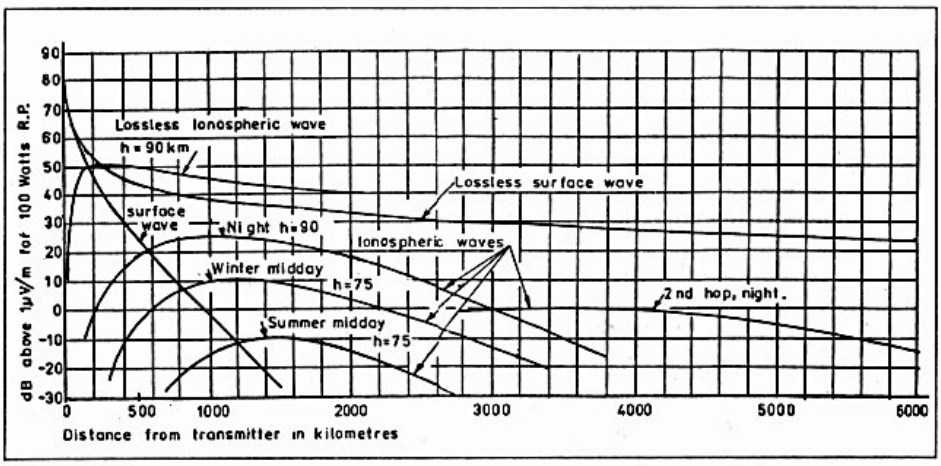

Figure 11. Propagation chart for 196kHz above poor ground

Other Factors in Sky Wave Propagation

The loss in ionospheric reflection is such that only low-angle radiation can be considered. At very low frequencies, loss in the ionosphere is low, allowing long-distance communications.

The loss in reflection from the ionosphere shown in figure 7 is not all total loss. The graph represents reflection of vertical to vertical polarisation. As with HF ionospheric reflection, a proportion of the energy is converted to horizontal polarisation. This is brought about by interaction between moving electrons in the ionosphere and the earth's magnetic field. Horizontally polarised waves are undetectable at ground level due to phase inversion and cancellation. The horizontally polarised component is reflected by the ground and on the second hop some signal is converted back to a vertically polarised signal and adding to the second reflected vertically polarised signal.

The magnitude of both the direct reflected wave (vertical to vertical) and the converted reflected wave (vertical to horizontal) is affected by the direction of the earth's magnetic field and the direction of propagation. These effects are very complicated and won't be considered here, but it is interesting to note that propagation is better in some directions, particularly from west to east.

As well as path loss, it is possible to calculate the relative phase of the signal

along its path. For example, where the sky wave is similar in strength to the surface wave, or where the first hop is of similar strength to the second hop, it is possible to determine whether they add or cancel. This is also not dealt with here, to simplify calculations. It can be considered that, where two paths meet and are of similar strength, the average effect is an increase of 3dB, but complete cancellation with a zero strength is possible.

Calculation of Path Loss With Examples

The calculation of surface wave field strength is as follows:

Ezg[dB above 1μV/m]=109.5 + 10log Pr[kW] - 20log d[km] + 20Log|Wn| (9)

104.8 is the field strength in dB above 1uV/m at 1km from an isotropic antenna radiating 1kW. 109.5=104.77 plus the gain of a vertical short monopole above ground, 4.78dB. 10Log Pr[kW] is the correction for radiated power. 20Log d is the loss due to spreading over the path distance in kilometres. 20Log|Wn| is a negative value and can be obtained only from graphs published in many texts on propagation. The value of the whole equation can similarly be obtained. It is not proposed to further elaborate on equation 9.

NP calculation of sky wave field strength is as follows:

Ezm[dB above 1μV/m]=109.5 + 10log Pr[kW] - 20log(d+ d1) [km] + 20log(cos et) - Lt + 20mlog|Ri|+ 20(m-1)Log|Rg|+ Cm + 6 - Lr + 20log(cos er) (10)

109.5 is defined above. 10Log Pr[kW] is also defined above. 20Log(d+d1) [km] is the loss due to spreading over the total path distance in kilometres. The path distance for a sky wave is calculated from the geometry of the configureuration. To save space, no explanation of the method is shown here, but reference 1 gives a good guide. Lt is the cutback factor at the transmitter. 20mlog|Ri| is the ionosphere reflection loss for each of m hops obtained from figure 7 and/or equations 7 & 8. For multi-hop, polarisation conversion at reflection may be appropriate, but is not detailed here. 20(m-1)log(rg) is the ground loss for each of m hops. Ground reflection is included in most texts on propagation, and is also not detailed here. Cm is convergence factor (see figure 10).

20log(cos et) and 20log(cos er) represent the vertically polarised component of the signal at a radiation angle e at both the transmitter and receiver. (In other words, radiation pattern). Normally the radiation angle at the transmitter is the same as the reception angle).

6dB shown here represents the amount the vertically polarised signal strength above a perfect ground is increased at the receiver, because of the adding of the direct ray and the ray reflected from the ground. Lr is the cutback factor, which modifies the signal at the receiver in the same way as at the transmitter. It represents the amount by which the received signal is reduced by ground loss. In Watt, the 6dB gain of the antenna above a ground is included in the cutback factor graphs, but the author believes the method used here is more straightforward.

Using these formulas, graphs for path field strength have been worked out for propagation at 196kHz. On the graphs, the line for a lossless surface wave and a lossless sky wave are shown. The graphs have been worked out for a transmitted power of 100W. In practical situations, the radiated power is a lot less than this, and in a back-yard situation may be less than one per cent. The reader should, therefore, correct the field strength shown according to the actual power. The path signal strengths are shown in figure 11 with a linear distance scale for clarity. All graphs have been worked out for a poor ground with a relative permittivity of 5 and conductivity of .002 Siemen/metre.

Readers might find all this a little hard to follow. The only way to understand it properly is to set a problem and work it through. The author has placed the calculations on computer, but at the moment the procedure is not complete.

A sample calculation sky wave propagation is as follows:

Frequency	196kHz
Earth radius	6370km
Atmosphere factor	1.33
Hops	One
Earth	Poor
Time of day	Night
Radiated power	100W
Assume loss for cos i=0.16 is 12.5	
Distance	1000km
Ionosphere height	90km
First factor	109.5
10log Pr[kW]	-10.0
Path distance	(1021)
-20log(d-d1) [km] spreading	-60.1
Elevation angle radiation Et	(8.40)
cos Et (antenna pattern)	(0.99)
20log(cos Et)	-0.1
-Lt cutback	-3.3
Incident angle at ionosphere	(78.10)
Cos i	(0.20)
20mlog(Ri) at i=77.6	-16.0
Cm convergence	2.0
+6	6
-Lr same as Lt	-3.3
20log(cos Er) reception angle (same as for Et)	-0.1

Total signal strength at 2 4 . 4 d B above 1uV/m receiver

Atmospheric Noise

The final factor to be considered is atmospheric noise. No matter how strong a signal is, signal to noise ratio is always the limiting factor. Of course, man-made noise is also important, but it is quite unpredictable. Atmospheric noise at LF is high and increases at a very high rate with decreasing frequency. Noise maps and curves are given in texts on the subject. Several typical noise figureures are given here as a guide to noise level on 196kHz. They are based on noise maps at 10kHz. Doubt is expressed as to whether the figureures can be extrapolated this far, but they may be useful. The figures are based on CW reception with 100Hz bandwidth at 200kHz reception frequency and are relative to 1uV/metre.

Summer day	-15dB
Summer night	-5dB
Winter day	-30dB
Winter night	-18dB

Final Observations

Low-frequency propagation (10 to 200kHz) differs from high-frequency propagation in a number of respects. Surface wave propagation is very strong. There is no skip zone, even though only low-angle sky wave radiation is dominant. This is because of the low height of the reflecting plane, and the long distance travelled by the surface wave. Where the surface wave meets the sky wave, the two merge together, possibly with some cancelling or adding of the two where the strengths are equal. From observation at the receiving site there is no apparent difference between a surface wave and a sky wave. The only actual difference is that the phase velocities are different. More will be said about this in section 4.

From 200kHz down, both surface wave and sky wave improve. The result is that the zone where the surface wave equals the sky wave remains between 500 and 1000km. At 200kHz propagation is poor in the day and reasonable at night. Between 10 and 30kHz, propagation is excellent both day and night. The main limiting factor from an amateur point of view is noise level. The frequencies where propagation is best are those where noise is highest. This is the main reason for very high powers being used for very long distance communications. Another reason for high powers being used is poor antenna efficiency.

On the frequency used by the small group of experimenters here (ref 4) signals transmitted by the author were heard day and night in Adelaide and Hobart, and at night in Brisbane. I don't think the full potential of this has been realised. Experimenters in America with very small power have achieved quite good results.

References

3. Experimental Stations on 196kHz, *Amateur Radio*, July 1984
4. Good explanations of surface wave propagation appear in the RSGB *Amateur Radio Handbook*, and most textbooks on propagation
5. *Radio Engineers Handbook*, Terman, Section 10, Article 5, Reflection of Radio Waves

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Getting Started in Amateur Radio Satellites - Part 7

BILL MAGNUSSON VK3JT, 359 WILLIAMSTOWN RD, YARRAVILLE 3013

LAST MONTH I TOOK YOU through a list of goodies that would set you up with a station for working all the current and near future amateur satellites. Looking back over the series it was a far cry from the very simple gear we used to listen in on the telemetry beacon and digitalker from DOVE in the first article. I hope you've maintained your interest.

The station is now much more complex. Your knowledge of the subject would need to have progressed similarly to enable you to use the station fully and successfully. I hope you took my advice and started to build up your library on amateur radio satellites. I also find it very useful to file and index all messages from the packet BBS regarding the Oscars. This can become an indispensable reference source if kept up to date. Next month I'll be summarising all the currently operational amateur satellites and taking a look into the future. What's planned and when.

This month is devoted to a look at the current birds capable of packet radio operation.

The first operational digital store and retrieve (DSR) satellite was UoSat-2, (Oscar-11). The digital communication experiment it carried was designed to test out the feasibility of such systems in a low-earth orbit. It was a test bed for hardware and software to be used later in Pacsat, Lusat and other such birds.

Packet DSR systems lend themselves very well to operation in orbit. A satellite transponder is useful only to stations mutually inside that satellite's footprint. This can be almost half a world or a couple of thousand of kilometres, depending on the particular bird. With a DSR system, however, you can upload a message in much the same way as to your local packet bullet board system (BBS). It can be retrieved anywhere else in the world, usually in under six hours if the satellite is in a near polar orbit.

The UoSat-2 DSR is not open access in the normal BBS sense. Due to limited memory in the on-board system, it makes use of "gateway" stations around the world. VK5AGR is our local gateway. Graham can forward messages sent to him by packet or other means. The vast bulk of traffic on this device is to and from the other satellite control stations. It was never intended as a general communications gateway, but simply as a test of the hardware and software. You can listen to the UoSat digital communication experiment, or DCE as it's known, and you don't need a packet TNC. Unlike normal packet, it sends frames made up of asynchronous characters. You will, however, need a UoSat demodulator. The DCE comes down as part of the general beacon stream consisting of telemetry, whole orbit data, diary and bulletins. It usually contains a summary of current messages and very often the latest sets of Keplerian elements for the presently active amateur satellites. Software is available from University of Surrey through Amsat-UK for stripping out and formatting the Kep elements from the DCE frames. It's called "DCE capture".

The first open access amateur satellite packet BBS was on JAS-1, launched by JARL on 12 August 1986. It had four uplink channels in the 145MHz band, and one downlink channel in the 435MHz band. It used 1200 baud with AX.25 protocol. Uplink was on FM using AFSK as in terrestrial packet, but downlink used phase shift keying (PSK) modulation and SSB as the mode of transmission.

Many operators world-wide built the G3RUH JAS-1 modem which was needed to go between the radio and TNC in order to cope with the PSK on downlink. It also included an auto-Doppler correction circuit to cope with the tuning problems on the 70cm downlink. Remember, this is not a transponder. It's just like a crossband mailbox in the sky, so there's no cancellation of Doppler by an inverted output. The rate of change of Doppler shift on 70cm is rather savage on an overhead pass, and without auto-tuning it would be difficult to make and maintain contact.

JAS-1 suffered from the start with power budget problems. Despite the somewhat erratic scheduling of modes with much unannounced switching between the analogue (mode JA) and digital (mode JD), many stations used the DSR feature of JAS-1 mode JD (digital). The BBS worked successfully using the callsign 8J1JAS. Its mailbox relayed messages to and from operators in many countries. It was officially switched off late in 1989 due to the impending launch of its successor JAS-1b on 7 February 1990. JAS-1b uses the callsign 8J1JBS.

Incidentally, like JAS-1, JAS-1b also carries mode JA. Analogue mode JA is a linear inverting transponder. It can be used for normal SSB voice or CW communications.

To work the BBS on JAS-1b you will need a PSK demodulator for downlink, and an SSB receiver. Circuit boards and kits and completed PSK demodulators are available from a number of sources in Australia. Its uplink is just like connecting to a normal terrestrial BBS. Except, of course, you need to point your antenna up in the air! It uses 1200 baud FSK on FM. The uplink channels are 145.850, 145.870, 145.890 and 145.910MHz. Listen first to see if you can hear any local stations, and choose an appropriate uplink channel. The downlink is on 435.910MHz. It is 1200 baud PSK (SSB) using AX.25 protocol. You will need a G3RUH or TAPR or PacComm PSK modem. You may have one of the new all-singing, all-dancing multi-mode modems, in which case it will probably have PSK on board. The beacon is on the downlink channel. Listen for it before trying to connect to the BBS. It is in a power-saving mode which transmits only short bursts until someone attempts a connect. It then springs into life. A connect is made in the usual way by typing C<space>8J1JBS<Enter>. If you're successful, you'll be greeted with the usual ***CONNECTED to 8J1JBS' line, and a prompt line showing commands as in terrestrial PBBS operation.

Including JAS-1b, there are four currently operating packet capable amateur radio satellites. The others are UoSat-D (Oscar-14), Pacsat (Oscar-16) and Lusat (Oscar-19). JAS-1b has the designation Oscar-20, being the 20th Oscar to achieve orbit and operational status.

To work all of them, your station would need to be equipped with the following:

2m and 70cm FM and SSB

2m and 70cm tracking antennas (auto-tracking essential)

A good computer (preferably IBM or clone)

Normal packet capability, including 9600 baud

PSK modem with auto-tune

G3RUH UoSat demodulator

An operator with lots of skill and pa-

(Continued Page 19)

Technicalities

COMPILED AND CONDUCTED BY ROGER HARRISON, VK2ZTB

THIS COLUMN IS DEDICATED to disseminating practical, do-it-yourself hints, tips and techniques for the amateur interested in experimenting, tinkering and homebrewing — the "Saturday arvo solderer rules, OK!"

The one thing that stymies so many newcomers when it comes to experimenting with RF circuits is *construction practices*. A recent two-part article in the February and March 1991 issues of the RSGB's *RadCom*, by Ian White G3SEK, on "How to Lay Out RF Circuits" provides good, practical advice for experimenters.

As Ian points out, "If a circuit is well designed on paper, it only has the *potential* for working well. How it works *in practice* depends on the layout. Poor layout can ruin the performance of even a well-designed circuit.

"Most layout problems with RF circuits can be traced to unwanted coupling or feedback of signals from one part of the circuit to another. Strong positive feedback can cause oscillation, and negative feedback may cause mysterious lack of gain. At lower levels of unwanted feedback, the equipment may work after a fashion, but behaves in a skittish and unreliable way."

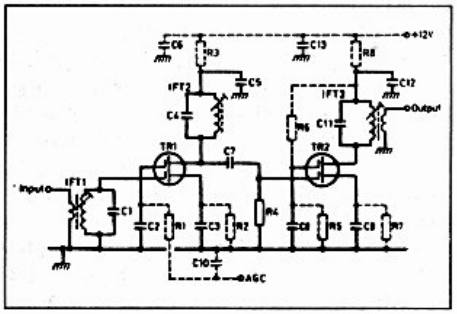

Figure 1. A two-stage IF amplifier used in the example of RF layout illustrated in Figure 2. The dashed portions of the circuit delineate the strictly DC sections and components. (Courtesy RadCom).

Ian goes on to explain the techniques or 'rules' of good RF layout, pointing out that it is easier to implement with 'ugly' construction in which no attempt is made to make the layout look 'pretty', rather, the major concern is making it work.

The first rule is: DO NOT WIRE RF CIRCUITS AS THEY ARE DRAWN.

To illustrate, Ian White uses a two-stage IF amplifier circuit using dual-gate FETs, as in Figure 1, giving a preliminary line-up, Figure 2a, and then final RF layout, Figure 2b. The principles employed are straightforward:

1. Lay out the signal path in a straight line (from input to output).

2. By juggling with the orientation of the components in the RF signal path, group the RF ground connections for each stage close together, without mixing-up the input and output grounds.

3. Place the non-RF (i.e DC section) components well clear of the signal path, throwing in some extra decoupling components.

The "extra decoupling components" refers to capacitors C6 and C13. While they are seemingly in parallel, and circuit-wise, one is sufficient for bypassing of the positive supply rail, each stage is best bypassed as close as possible to the positive dc supply "entry" point.

Thus, when laying out an RF circuit, you need to first identify three things:

(i) which are the RF components, as distinct from those which deal with DC or low frequencies?

(ii) which components are in the main RF signal path?

(iii) which components are in the ground return paths.

The copper on a single sided sheet of pc

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Getting Started in Amateur Radio Satellites

(Continued From Page 18)

tience ... and, finally

A library of up-to-the-minute information on just about everything to do with satellites and packet.

Combined with all the other goodies already mentioned to set up a satellite operation, this may seem like a tall order, and it is. It may be some consolation to know that there are probably no more than a dozen or so stations in VK that can comfortably cope with ALL the modes on ALL the Oscars. Most operators specialise.

Many only work the high flying birds like Oscars-10 and 13. Some find more challenge in working the low-earth transponders like RS-10/11. Still others (perhaps with a mathematical bent) find fascination in translating telemetry information.

If, however, you develop an interest in the orbiting digital bulletin boards (the packet birds) you will need to put in a lot of work on your station to get it all together. Any compromise will be reflected in your results. You would need to have a complete station, a broad operating experience base both in satellites and packet, and be willing to spend a lot of time combining the two into a smooth operation. It would also help to have six arms!

The situation at the time of writing is that the new micro-sat BBSs will require specially written software for your computer. The problem is that most terrestrial BBSs and other packet applications at present run at 1200 baud. There are moves to increase this, and some systems are running at 2400 baud already. Time, of course, is of the essence. As more users wish to avail themselves of the ability to transfer files and large documents, 1200-baud systems have trouble with throughput. Terrestrial systems with lots of users find it hard to cope, and the inevitable way out is a general move to higher baud rates.

As if that's not enough, a satellite BBS has another problem. That is the limited time that a low-orbit bird is in your sky. Typically, only 10 to 12 minutes or so in the case of a fairly high pass. You may be able to extend that out to 15 or 16 minutes with a high gain antenna and accurate auto-track system. If the downlink is running at 1200 baud it can quite easily tie up the system for the whole of the pass if someone is uploading or downloading files. Tests on UoSat-3 (Oscar 14) have shown that a system running at 9600 baud can handle file and document transfer very well. Receiver bandwidth will need to be addressed as the system develops. Software protocols are being specified presently, and no doubt the software developers will soon be well under way.

It's hoped that the software will be available by the time the new microsat BBSs are fully commissioned.

Our station may well be required to have the ability to switch baud rates during a connect to cope with different downlink applications.

Next month's article will give a summary of all the current amateur satellites, and try a bit of crystal-ball gazing. There are lots of exciting plans in the wind.

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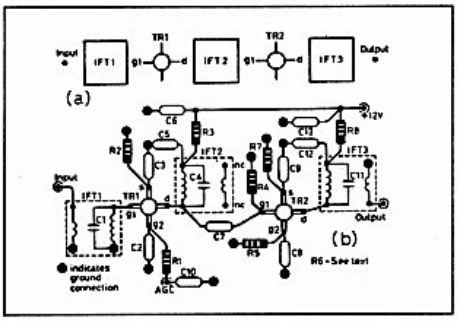


Figure 2. Layout sketches of the Figure 1 IF amp; (a) preliminary line-up and (b) the final RF layout. (Courtesy RadCom).

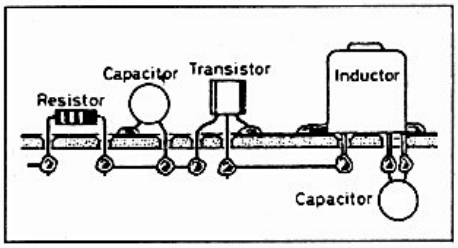


Figure 3. Wired-track RF construction, using a single-sided board, copper side uppermost. (Courtesy RadCom).

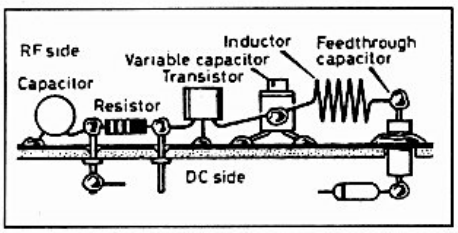


Figure 4. Pin-and-wire RF construction, again using single-sided board, copper side uppermost. (Courtesy RadCom).

board makes an ideal RF ground, generally termed a "groundplane". As Ian White explains, "Almost every RF circuit has an input, an output and a common ground connection. Many circuits also have additional ground connections, both at the input side and at the output side. It is vital to keep input and output ground connections distinct, and to place a low-impedance common ground between them."

You can identify components in ground return paths because they provide a path for RF and a point where dc or LF enters the RF circuitry. Hence, bypass capacitors in the drain and source circuits of Figure 1, for example, provide ground returns. Hence C3 and C5 in Figure 2b are soldered to the same point on the copper groundplane, as are C9 and C12.

He goes on to explain quite a few more techniques, such as dividing a project into modules which can be separately boxed and screened, using screened inductors or toroids in preference to open coils (at frequencies where its practicable), placing RF and DC circuit sections on opposite sides of the board to avoid coupling RF into supply circuitry, and more.

You don't need to lay out and make a 'proper' printed circuit board, either. Ugly construction will get you a working circuit with just as much satisfaction and less frustration. A piece of single-sided pc board with 'wired tracks' works fine, supporting components on pc pins, gluing ICs in place with their legs in the air, and using direct wiring between circuit points. The 'pin-and-wire' technique is similar. Figures 3 and 4 show how it's done.

You simply mark out component and pin positions and drill the necessary holes (typically, 1.0 mm) in a piece of single-sided board, remove the copper groundplane from the immediate vicinity of the holes using the point of a 3-4 mm drill held in the fingers, and then wire up the back (i.e. non-copper) side of the board using bits of hookup wire or tinned copper wire. Such construction is quite robust; big components can be held in place on the board with cyanoacrylate ('Super') glue. Figure 5 shows how such boards may be mounted in a screening box.

Where connection points may be required on the copper side of an ugly construction board, you can cut out an 'island' of copper, or glue a small patch of single-sided blank pc board where its needed, as illustrated in Figure 6.

When mounting ICs to such a board, you can tip them on their back (so-called 'dead-bug' construction) and glue them in place on the copper side of the board, bending grounded pins down and soldering them directly in place. (If you don't want to glue them down, just let the ground pins hold them). Alternatively, you can place them right side up ('live bug' construction). Both techniques are illustrated in Figure 7.

For those who are newcomers to RF construction and experimentation, Ian White recommends the ARRL's *Solid State Design for the Radio Amateur* by

(Continued on Page 21)

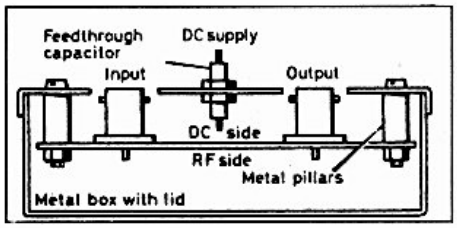


Figure 5. Mounting such boards in a metal shielding box. (Courtesy RadCom).

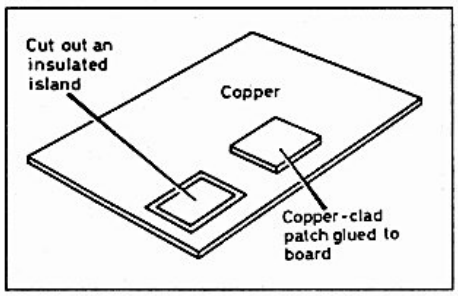


Figure 6. Connection point on the copper side can be arranged by cutting away the copper to form an insulated island (use a sharp hobby knife for this), or by gluing a small patch of copper-clad board on the copper side. (Courtesy RadCom).

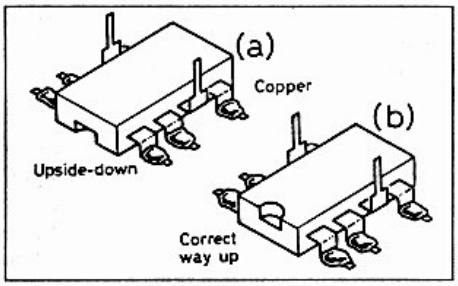


Figure 7. Showing 'dead bug' and 'live bug' mounting of ICs. (Courtesy RadCom).

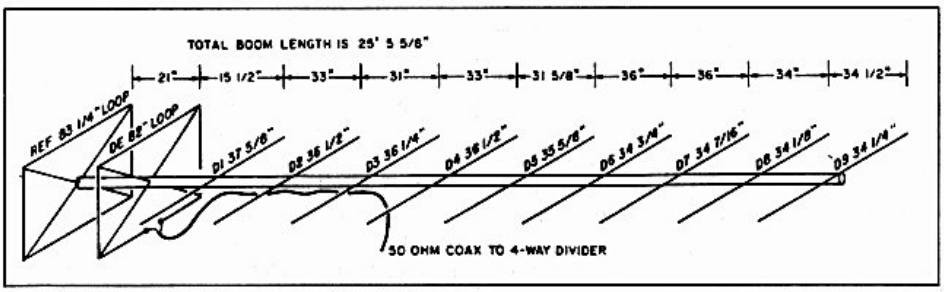


Figure 8. W5UN's long boom Yagi optimised for 144.050 MHz, giving a gain of 13.25 dBd. The directors are all made of one-eighth inch solid aluminium rod cut to length with a tolerance of plus/minus one-sixteenth inch. The reflector and driven elements are shaped into square loops using No.12 solid insulated copper wire ('TW type' insulation, which means nothing to me); insulation left in place. The boom is either non-conductive sealed wood (e.g. soak it in Linseed oil) or fibreglass. (Courtesy 73 Amateur Radio Today).

Mini Equipment Reviews

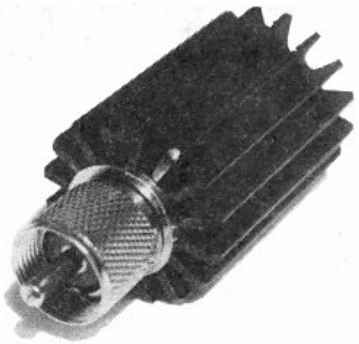
RON FISHER VK3OM
24 SUGARLOAF RD BEACONSFIELD UPPER 3808

OVER THE NEXT FEW MONTHS, we are going to present a series of reviews on small ancillary pieces of equipment that you will find useful around the shack to increase the versatility of your gear. We will look at such items as microphones, speakers, SWR power meters, antenna switches and the like. Let's hope that you find it of interest, and if there is anything you would like to see written up, drop a line and let us know. To kick off, here are three useful antenna items from the Dick Smith catalogue.

The Dick Smith 15-Watt Dummy Load. Cat D-7025

As everyone knows, a good dummy load is an essential item of test equipment in the shack. The Dick Smith unit is made in Japan by the Revex Co, with a finish and construction that are first class. As the photo shows, it is very compact. Rated at 15 watts continuous dissipation, it will actually take up to 100 watts for short periods. A rating graph is supplied which enables you to work out how much power you can apply. Of course, the ratings apply to steady power as produced by an FM transceiver, or by your HF transceiver when operated in the CW mode. When in the SSB mode your average output is probably about only 50 per cent of the PEP output, so you can use the dummy load for a longer period of time. The load was tested under a variety of conditions. With 100 watts applied for the maximum 30 seconds, the load became very hot (on a cool day), so it's important to make sure that there is plenty of space around it to allow enough air circulation. It also needs enough time to cool down before being used again.

According to the instruction sheet, a version with an "N" type connector is



15 watt dummy load

produced, but I am unsure if Dick Smith stocks this. If they do, this would be recommended for use on 430MHz and above. The PL-259 version is rated for use to 500MHz, but with a 1.15 VSWR at the highest frequency.

The instruction sheet supplied, actually part of the packaging, is adequate, but some translation into English is needed. For instance, "As this device absorbs a high frequency current completely, it can supply actual current to high frequency equipment with emitting a spurious current." Perhaps they are right, but I am really not sure.

The Dick Smith S-20 Quality Two-Way Coax Switch. Cat D-5208

Again, this is produced by Revex in Japan for Dick Smith. Described in their catalogue as a "quality" switch, it certainly lives up to the title. Although rated for use up to 1000MHz, the use of standard PL-259 connectors fitted to your coax cable would, to my mind, limit its normal use to the 2m band, with possible occasional use on 70cm. Again, a version of the switch is produced with "N" type connectors and is stocked by Dick Smith (Cat. D5202).

The internal construction allows a constant 50-ohm impedance to be maintained. The front switch actually moves an internal metal leaf from one output connector to the other. Rated to carry up to 1000 watts PEP, it would be more than adequate for Australian conditions. The switch is built into a heavy diecast housing and fitted with three mounting lugs which enable it to be screwed to a wall or to the operating table.

Again the instruction is part of the packaging and takes a bit of translating. However, the specification is straightforward enough, and I guess that's about all you really need.

Power/SWR Meter with PEP Reading. Cat D-1360

This is a very elegant meter which will provide you with a lot of information. It is rated to operate over a frequency range of

(Continued Overleaf)

Technicalities

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Doug DeMaw W1FB and Wes Haywood W7ZOI. I heartily agree with his recommendation. It's available through Divisional bookshops and worth every cent of its $21.60 price. Fortunately, much of the RF componentry used in the projects described is available in Australia through firms which advertise in *AR*.

Long Boom Yagi for 2m

Few 2m band enthusiasts would not be aware of Dave Blaschke W5UN. He has the singular honour of having worked 100 countries (gaining DXCC) on 2m - via Moonbounce! Secondarily, he's famous for his Might Big Array (MBA) 2m moonbounce antenna system which uses 48 stacked long boom Yagis, boasting a gain of just over 30 dB.

In an article titled "Two Metre EME Primer" in the March 1991 issue of *73 Amateur Radio Today*, Dave says that it's quite possible for 2m stations of quite modest capability can work moonbounce — 100 watts of RF to a long boom Yagi having at least 13 dB 'true' gain over a dipole can work his station. Certainly, there are plenty of VK 2m operators who can attest to being able to hear W5UN via moonbounce. In his article, Dave describes a long boom Yagi optimised for 144.050, having a gain of 13.25 dBd, built on a boom about 25.5 feet long. Dimensions are given in Figure 8. The driven element and reflector are both quad loops, making this antenna a 'quasi-quagi' (a quagi is a Yagi array of quad loops).

Such a Yagi is also ideal for serious long distance terrestrial working on 2m and could be recommended for those who'd like to try their hand at aircraft-enhanced long distance contacts, where a lot of work has been done on the Sydney/Canberra-Melbourne path and the Sydney-Brisbane path. **ar**

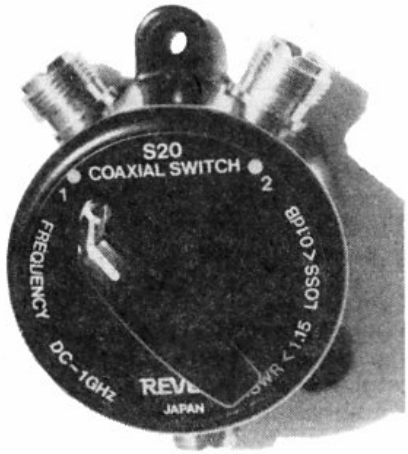

Figure 2

Mini Equipment Reviews

(Continued From Page 21)

1.8 to 60MHz, with a power rating of up to 2000 watts.

One of the great features of this meter is its ability to show actual PEP output. An internal circuit board with four transistors and two 741 ICs operate this circuit. This and the 2m illumination lamps require 13.8 volts at 200mA from an external source.

Three power ranges are provided, 0/20, 0/200 and 0/2000 watts full scale, and for the QRP operator, accurate reading as low as one watt can be taken. The external DC supply is required for the power meter to operate, but SWR measurements do not require it.

Pulling out the "calibrate" knob enables the PEP facility, and I found that it is best to leave it in this position at all times, as the average reading remains the same either way.

I found that I would have preferred the PEP measurements to have a slightly longer decay time.

I think some type of "peak hold" circuit could be useful. The accuracy was checked on steady carrier of various power levels against my standard RF watt meter and found to be within five per cent.

Figure 3

It was noted that the specification states that the reading will be five per cent high on 160 and 80 metres, and this was found to be correct. With 13.8 volts connected, the meter presents a most attractive appearance. The instruction sheet supplied was obviously written in Australia by the Dick Smith staff. There is no Japanese English. A full circuit diagram is included.

All three of these items are recommended.

Prices are as follows: the 15-watt dummy load, Cat D-7025, $39.95. The Quality two-way coax switch, Cat D-5208, $69.95, and the Power/SWR meter, Cat D-1360 is $199. They are available at most Dick Smith outlets.

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Microwaves ... The New Frontier

LES JENKINS VK3ZBJ
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FRANKSTON 3199

BORED WITH REPEATERS? Tired of the bedlam of HF DX? Put off by packet? Soured with satellites? Then perhaps there is another aspect of amateur radio that has escaped your attention.

Amateurs have always been somewhere about when the major breakthroughs in radio communications occurred. It may well have been before your day ... even before you were born. Nonetheless, there are still frontiers of technology to be exploited and there is no good reason not to be involved.

There is a strong suspicion that old Mr Hertz produced his first "clicks and clunks" on microwave frequencies. If this be the case, we have certainly taken our time to catch up with the old codger! Nevertheless, the latter part of the 20th century heralded the move to more and more use of microwaves, as satellites cluttered our skies and true global communications emerged.

From an amateur's point of view, this is a good thing. The more international communications move to satellites, the less pressure there is on our hallowed HF spectrum. For those dedicated to overseas contacts, the future looks fine.

Meantime, back at the microwave scene, great inroads are taking place in our amateur allocations. Why?? Simply, we don't seem to regard them as highly as we do our lower frequency bands, so who cares! We've got plenty of space to pursue our interests on those bands the rest have lost interest in.

New Horizons

AOCP candidates undertake a study course in their basic radio theory and regulations, with the Morse Code being an additional qualification. In most cases they will receive very little instruction in the specifics of applications of the higher frequency amateur bands. It is even probable that they will graduate and participate in the general activity without ever becoming aware of the existence of the many allocations available above, perhaps, the 23cm band.

Consider the HF dedicant who constantly strives to find some accommodation in the crowded bands available to him. To find a spare few kiloHertz is somewhat akin to finding gold in the back yard! Imagine his reaction to finding 150 MegaHertz of totally unused spectrum lurking in the 13cm band! To be advised that another 150MHz is also lurking between 3300 to 3400MHz would only rub salt into the wound.

Some History

Most HF operators have been schooled to believe that VHF is limited to short "line-of-sight" paths. In spite of this indoctrination, many amateurs throughout the world have blissfully ignored these precepts and made contacts over many thousands of kilometres on VHF, UHF and microwave frequencies. Having done so, they join the very elite band of operators in the Hall of Fame.

These super contacts are not confined to overseas countries, with Australian amateurs being well in the forefront of this activity. Transcontinental contacts on bands up to 3300MHz have been achieved in recent times, and these record contacts are constantly under attack by other dedicated stations desirous of becoming world or national record holders.

Current standings in this field are published in most of the amateur journals or call books. They make very interesting reading and serve as a guide to the goals which might be set by operators interested in making a serious onslaught on some of the records.

What's Happening?

To the majority of operators, this will seem too ho-hum to be bothered with. For a start, the necessary equipment is not listed in the inventories of major suppliers, so is inaccessible to the rank and file of operators. Many will lack the technical skills necessary to attempt construction and will be hard-pressed to find any help from local amateur publications.

There is, however, an alternative path which can be taken. This is simply to search out those operators in your area who are active on these bands. To assist in this, I have included some names and callsigns of active operators in the major capital city areas. These "hams" are always on the look-out for new blood to help populate the bands and provide more contacts in their area.

Whilst there is not a lot of general activity on the bands, it must be borne in mind that, unlike the lower frequencies, the coverage of many microwave stations is limited by the very narrow beamwidth of antennas. Nevertheless, the type of transmission possible on these bands makes them attractive for point-to-point links between stations which are interested in high quality television or high-speed data exchanges.

Wide-band modes are not the only ones supported by present activity. SSB may be heard on 1296 and 2300MHz. Narrow band FM (+/- 3kHz deviation) is commonly used on bands up to 10,3000MHz. Some SSB is contemplated on 3300MHz, and some overseas operators use SSB on 3cm.

In most cases the power available is quite low. One hundred watts on 1296 is rare, but, add to this some 25dB of antenna gain from a 2m dish (316 times) and the effective power becomes 31.6kW ERP! Even on 3cm (10,000MHz), 100mW times 33dB antenna gain becomes 200 watts ERP. Add to this the same antenna gain at the receiver, and the equivalent power between dipoles becomes quite alarming! (Try 400kW ERP!!!)

Bear in mind these 33dB gain antennas are the size of a dustbin lid (about 57cm or 2ft in diameter) and the message is loud and clear.

What's Available?

In short not very much!

There are quite a few commercial rigs available for 23cm at this time. They range from basic one-watt FM units to 10-watt multi-mode devices. Sadly, not many of these rigs appear to be attached to respectable antenna systems, most operators being satisfied with the inadequate vertical devices offered by the agents. Common practice dictates horizontal antennas of respectable gain as the preferred option.

There are a few kits available for 23cm and 13cm, most capable of SSB operation when driven from a 2m rig. None of these offers much power and they are, at best, a starting-off device. Notwithstanding, they are providing some quite exciting results for those who have taken the plunge, particularly when supported by some of the more robust stations.

Three centimetres is a favourite band

(Continued Overleaf)

Amateur Television - Whither Hence?

BY JOHN INGHAM VK5KG
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ATV IS AT THE CROSSROADS; 576MHz rescinded; ATV repeaters closed down to make way for broadcast TV transmitters; WARC-92 looming with the threat of loss of much of 420-450MHz. Where is ATV heading?

First, allow me to establish my credentials as an "ATV seer"! While many may know of my activities as the WIA Federal Videotape Co-ordinator, my interest in amateur television started some 30 years ago in the early '60s, long before non-broadcast video recorders were developed.

But it wasn't until the early '70s, when I was living in Edmonton, Canada that I struck up a friendship with a fellow ATVer whose QTH happened to be at the bottom of a very deep river valley. Try as we might we could never exchange pictures between our QTHs. One day, the idea occurred to us to build a small ATV repeater and site it on the rim of the valley. As I thought long and hard about it, I realised that the advent of the repeater would have a far greater impact on ATV operation than it has on phone operation.

If you have never attempted point-to-point ATV transmission, it would probably never have occurred to you just how difficult it is. Because of the very wide bandwidths involved, and the very high frequencies to which ATV is confined (with the attendant high path losses), it is necessary to use very high gain (and very directional) antennas for both transmission and reception.

Under these conditions, unless both antennas are already aligned, it is unrealistic to expect many replies from an ATV "CQ" call. It occurred to me that an ATV repeater situated high above "ground clutter" had the potential to revolutionise ATV operation; at last ATVers would know where to point both Tx and Rx beams *prior* to calling CQ!

We never got around to building that first ATV repeater, but I published my ideas in a Canadian amateur radio newsletter before returning to Australia late in 1973. I found the Adelaide ATV scene much as I had left it, but with a handful of diehards struggling to punch their signals through the suburban tree-lines. After I had become established at my new QTH I interested the local ATV group in an experiment to prove the merits of an ATV repeater. Using a 576MHz transmitter built by Maitland Lane

(Continued Overleaf)

Microwaves . . . The New Frontier

(Continued From Page 23)

for contemplation. The ready availability of basic Gunn oscillator assemblies makes it an attractive proposition, but most enthusiasts seem to fall apart when antennas and receiver "back-ends" require to be made! There is an alternative which makes use of speed radar detectors (now illegal in some states) which make excellent receivers with little modification.

Crystal locked gear for 10,368MHz is achieved by the use of step recovery diodes (snap-off diodes) driven from a few watts at 1296MHz. This technique can yield up to 200mW in a simple waveguide multiplier. Receivers can be produced in much the same way, using cheaper, low power SRDs and simple mixers. Alternatively, Gunn oscillator receivers, followed by a simple tunable IF receiver with AFC, give good results.

Who's Out There?

Unfortunately, not too many! Still, there are several stations in the capital cities which are active.

In Melbourne VK3s ZBJ, YTV, BBU, ZJC, KAJ are well equipped for bands up to 25GHz. Numerous modes are available, including FM television on 2431MHz from 3ZBJ and 3YTV.

Sydney has Bill VK2ZAC, with several others in the wings. Lyall VK2ALU is actively investigating 3cm propagation from the Wollongong area, as well. *(The original text also mentioned Dick VK2BDN, who became a Silent Key recently.* Ed). The ACT is represented by Eddie VK1VP, who is active on at least 1296MHz. (I well remember our first contact, Eddie, over the expanse of Lake Burley Griffin).

Further north, Steve VK4ZSH carries the banner, and would be pleased to hear from enthusiasts.

Over in the west we have Trevor VK5NC (Nasty Cough), who is "go" on 23cm and 13cm, with Chris VK5MC who has EME capability on 1296 and 2300MHz. Adelaide is host to Des VK5ZO and his partner VK5NT, along with Reg VK5QR, who is one of our most prominent achievers. His "partner in crime" is Wally Green VK6WG at Albany, who is a vigorous extender of records!

There will, of course, be others of whom I am not aware. They will excuse me for this, as our journals don't make much of their activities, so information comes only from personal contacts or "word of mouth". If you feel that your efforts or presence have been neglected, drop me a line, as we would be pleased to discover other stations which share our interests.

In Conclusion

As amateurs, we share a rare privilege in having available so many bands on which to experiment. The use of these bands reflects our interest and, hence, the continued availability of those privileges. If we choose to regard the "too-hard" bands as being of little interest, we leave a poor legacy to those who will succeed us.

Modern technology has several prongs. Digital concepts yield marvellous "gadgetry" which tends to obscure the radio-based technology on which it relies. The real progress in pure radio technology lies in the exploitation of those bands which are the basis of the modern communications explosion. As time progresses, more and more international networks will abandon HF for the more reliable microwave linked satellite facilities.

Amateur have been associated with satellite communications since the early days of its inception. Australian amateurs contributed to this when they built and launched OSCAR-5 in the late 1960s. Subsequent satellites have continued to be launched and will remain a major activity activity into the future.

It is certain that amateurs will follow the trends of commercial methods, and future satellites will provide access on much higher frequencies will form a sound basis for future access to these systems.

It may be of interest to note that, over the John Moyle field day weekend, VK3YTV portable at Mt Buninyong (near Ballarat) exchanged good television pictures with VK3ZBJ at Frankston. The frequency used was 2431.75MHz, and the mode FM. The distance is 121km. We were also pleased to have a visit from Steve VK4SZH during these activities.

So, the horizons are there; all we have to do is conquer them. ar

VK5AO, plus my own receiver and antennas, we duly assembled an ATV repeater on a high spot overlooking Adelaide. The rest is history.

While VK5RTV was not the first licensed ATV repeater in the world (we were beaten by a group in Washington DC) it was the first to be actually licensed in Australia. Since then, wherever an ATV repeater with output in the 576MHz band has been licensed, interest in ATV has soared.

Part of the success story of ATV in Australia can be attributed to the fact that the modern domestic TV set can tune to 576MHz (ch 35) without modification. Indeed, many present-day operators owe their start in our hobby by their chance stumbling across an ATV repeater output while "fiddling" with their TV set. And the ready availability of domestic TV cameras and recorders has also encouraged many more.

So, that brings us up to date. But, what of the future? Is there really nothing but doom and gloom for the ATV operator? Although at the turn of the century there probably will be far fewer ATVers able to transmit as we do today, perhaps all is not lost!

In the year 2000 the television telephone will be well established in many homes and businesses. The technology already exists. In September 1989 I saw a working demonstration in Melbourne of a digital television telephone whose use is intended for Telecom's new Integrated Services Digital Network (ISDN) and which has a bandwidth not much more than a single telephone conversation today.

True, its electronics took up the best part of a whole rack. But the promise is that, by 1994, development of dedicated large-scale integrated circuits will enable its size to be condensed into that of a shoe box, and sell for about the same price as a cellular mobile telephone currently.

A large base of domestic equipment suitable for use on ATV has been the catalyst for many operators in the past, and future ATV developments depend on narrower bandwidths. But, could a digital television telephone be put to use for ATV purposes?

In the rest of this article I will call on my experience in the field of digital compressed television for video-conferencing to explain something of the techniques digital television telephones use to compress a live wideband video signal so that it can be connected to Telecom's ISDN. Such compression is equivalent to squeezing some 900 telephone conversations down in bandwidth to that normally occupied by one or two!

This description is of a notional system; the exact details are being kept under wraps until the digital telephone is officially released.

Firstly, it must be understood that I am talking about **live colour TV** here, not slow-scan or monochrome television. However, certain compromises in picture quality have been made in line with the anticipation that the picture when displayed will be usually quite small, and gross movements of the subject are not expected.

As an initial step, a major reduction in the required bandwidth is made by halving the spatial and temporal resolution, ie by transmitting:

half the number of scanning lines
half the detail in each line
half the number of pictures/second

which leads to an eight times reduction in bandwidth (down to the equivalent of 125 phone conversations).

Corrections at the receiving end are, of course, applied to compensate. These double the number of scanning lines and pictures/second back to the original numbers, but the small size of the receiving screen reduces the need for as much detail.

The transmitting end contains a frame store which compares each new frame coming from the camera with the previous one; only those parts of the picture which contain actual changes are then transmitted. This again reduces the bandwidth by reducing the amount of information which needs transmission.

So as to analyse the screen for movement, the picture is subdivided into some 256 little squares, each being about 16 pixels by 16 lines. If any movement is detected in any square, the whole square is transmitted; conversely, if no movement is detected, then the frame store within the receiver simply repeats indefinitely the information contained within the square.

The information about each pixel is described in terms of the *difference* between its new value and its previous value. This information is encoded in a digital form in such a manner that the most statistically likely changes are transmitted using the shortest digital "words". This further reduces the bandwidth requirements.

If gross picture changes are detected at the transmitter, the system momentarily drops to a lower resolution mode. For instance, if you move out of camera shot and someone else takes your place, the effect is of a "rough sketch" transmitted forthwith with the details filled in almost immediately.

In case of interruption of the signal, the image on the receiver "freezes" until the signal is restored. At the start of transmission (and when recovering from transmission path errors which may scramble the picture) a fresh picture is established by slow-scan which takes several seconds. This uses special information which is continuously being sent as a background task for just such a purpose.

One of the features of the system as described is that it is one-way, ie it does not require a continuous "hand-shaking" between transmitter and receiver (in the manner of packet radio). Therefore, the information can be broadcast (to more than one receiver) or recorded for future playback. And digital sound is incorporated in the signal as well.

So how might the compressed television signal be transmitted? In its native form as a digital signal it would lend itself well (with suitable processing) for transmission and reception over long paths on amateur radio. However, in that form, its bandwidth would still be several hundred kilohertz , and careful filtering techniques would be required to avoid interference with other users.

Alternatively, the digital signal could be converted back to an analogue forms by means of a Digital-to-Analogue Converter (DAC).

In this form, with a bandwidth of no more than 10kHz or so, it might be frequency modulated and even transmitted on 144MHz. Imagine, live colour ATV on two metres!

So, there you have it! As we come to the end of the 20th century, maybe live amateur TV still has a future! But it will be very different from that which might be expected by an examination of a typical ATV station of today. **ar**

Don't buy stolen equipment - check the serial number against the WIA stolen equipment register first

Fox-Hunting Skills Put to the Test

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IN THE EARLY HOURS OF THE morning on Australia Day (26 Jan), a single-engine seven-seater Piper Saratoga aircraft with three persons aboard was cleared for take-off from the Mount Gambier airport by Civil Aviation's Flight Service Centre in Adelaide. The aircraft was heading for Warrnambool in Victoria. When the pilot failed to make radio contact after take-off, police in Mount Gambier were alerted and emergency contingency actions put in place.

The aircraft's emergency beacon, monitored by satellite, gave the position of the crash as some distance east of the airport. This was later found to be not the case.

Hampered by the blackness of the night, a search of the area by police, State Emergency Service, country and metropolitan fire service personnel proved fruitless.

At around 0245 local time, the police phoned Steve VK5NSE and Wayne VK5ZX. After quickly explaining the situation, a request was made for radio amateurs with direction-finding skills and equipment to join the search for the missing aircraft.

There was some doubt as to the authenticity of the phone call at first, since the last digits of the police phone number, 1020, were given over the phone by the police as "ten twenty". An unfortunate abbreviation. Was it a hoax? A return phone call confirmed that it was in fact a real emergency and that assistance was urgently required.

One of the search vehicles. Photo Border Watch *newspaper.*

Like most of us at that time in the morning, the rudely awakened pair was not at its best, but soon responded to the urgency of the situation.

The immediate questions requiring immediate answers at that early hour were:

"How does one DF an emergency beacon?"

"Who has the best fox-hunting expertise in town?"

"Who would have suitable gear that works?"

"How does one awaken somebody in the middle of the night to ask if he would like to go on a fox hunt, anyway?"

"Crikey - why us?"

Phone calls to Greg VK5ZGY and David VK5FF produced a brace of hand-held scanners capable of receiving the signal from the beacon, a pair of attenuators and Yagis, plus the expertise.

With the beams hurriedly modified for the lower frequency of the beacon, Steve and David set off in one vehicle, and Greg and Wayne in another.

Although the telltale smell of AVGAS was in the air, it was too strong to get a fix on the aircraft, and it was the direction-finding skills of Steve and David that finally led the rescue team to the wreckage. The official time for the discovery of the wreckage was 0450. Congratulations to all concerned.

Sadly, the pilot and his two passengers perished when the aircraft apparently clipped the top of pine trees just north of the airport and dived into the ground only a few hundred metres from the end of the runway. No official cause for the crash has yet been given.

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The wreckage 300-400m from the end of the runway. Photo Border Watch

How to Occupy the XYL So You Can Enjoy Urunga

MARILYN WILLIAMS XYL VK2BUI
LOT 5 MASTONS RD
KARANGI 2450

THE URUNGA RADIO Convention has come a long way since 1948. Back then, a few "hams" took their XYLs and harmonics to the coastal town for a relaxing long weekend. Only 25 kilometres south of Coffs Harbour, Urunga is at the mouth of the Kalang and Bellinger Rivers, an ideal fishing spot. Well, fishing and drinking are oft a pigeon pair, and while the lads "caught" dinner, the rest of the family could swim safely in the lagoon or catch some waves at Hungry Head.

These days, having just celebrated its 43rd year, the Urunga Radio Convention offers so much more. It kicks off on Easter Saturday morning with a street parade and market. The Senior Citizens' Hall houses an array of "beautiful junk" for your perusal between fox hunts. There is an assortment of irresistible raffles, and both technical and non-technical quizzes to keep the ladies thinking, too. The snack bar is open all weekend, supplying free tea and coffee and very reasonably priced steak, sausage sandwiches, and topped off with apple pie and ice-cream.

However, somewhere in between all this, the hidden transmitter hunts and trying to outfox the fox, the YXL and harmonics get restless.

The Bellinger Valley is embraced by magnificent mountains, unrivalled scenery, crystal clear waters, majestic rainforests and waterfalls. It forms part of a stunning array of coastal beaches, wetlands and river estuaries.

In less than half an hour the XYL can be wearing the harmonics out on a walk through the rainforest at Dorrigo National Park, which was placed on the World Heritage List in 1986. A new walkway and viewing platform allow visitors to stroll through the rainforest canopy. After that, they'll be glad to re-energise at the Carriageway cafe in Bellingen on the way back. They'll follow obediently as she peruses the Bellinger River Gallery, upstairs. On the way out, even the kids will find something of interest in the Hammond and Wheatley Emporium.

Of course, Urunga is still one of the best fishing and swimming spots around. Amateurs haven't tormented the yabbies in years, so they should be abundant. There's an opportunity to be educated at the large yellow concrete beehive known as the Urunga Honey Place. Or, you can relax at dusk with a Belgian beer in the Dutch Coffee House at nearby Fernmount. If wine is your favourite tipple, then the winery at neighbouring Raleigh will keep your tastebuds occupied.

Meanwhile, back at the convention, you can test your CW sending, and beat Geoff Pages VK2BYY next year. Or have a go at the scramble, and topple Grahame O'Brien VK2FA.

This year, the prize giving became an event in itself. Would Alan Savins VK2EFM have the energy to collect yet another award? Alan's a champion at Talk-Ins and 2m Mobile Hunts. He also won the 40m Fun Event and spotted the fault in the circuit diagram. Looks like he'll soon be able to build an "award" winning house!

Geoff VK2BYY is another hot contender. He won the 7meg hunt and correctly guessed, or maybe, calculated, one of the "capacitance in the bottle" competitions. Glenn English VK2JPR drew with Paul Mainey VK2KTT in the first Pedestrian Hunt, but took first prize in the second hunt.

The resonant frequency of the antenna was correctly judged by John Williams VK2BUI. His eagle eyes also sorted out how many "capacitors there were in the bottle", while his XYL took out the ladies' lucky door prize.

Rodney Somerville VK2URK won the technical quiz and the second "guess the capacitance in the bottle" competition. Viki's first puzzle was deciphered by Robyn Golden XYL-DGT, who also won the Easter cake raffle. Marie Warwick and Karen O'Brien (a VK2FA harmonic) found the duck in the second puzzle.

We hear the staff at North Ryde Post Office witnessed the king of jelly beans, Ron Swallow VK2GO's prize firsthand. Almost 263 beans burst from the padded postbag after their harrowing trip with our postal service. He'd forgotten he'd

The hounds and foxes on good terms before the hunt.

entered the competition!

The Easter Bunny raffle was won by Joan Colley of Coffs Harbour. A not-so-remarkable feat for a woman who's fostered 34 kids.

Alan VK2EFM did at least allow his father, Merv VK2DMS, to take home one prize - the gents' lucky door prize - although, of course, Merv couldn't be the fox along with Brian Slarke VK2ZCQ and win events at the same time! This slippery duo is determined to keep the fox hunt tradition alive. As usual, next year they will come up with more diabolical ways of eluding the hounds.

Henry Lundell VK2ZHE was surprised at his change of luck when he won the Planet desk lamp raffle. Everyone else was amazed that he had been persuaded to part with his money!

The 1991 *ARRL Handbook*, donated by Coffs Harbour Electronics, was won jointly by Arnold Austin VK2ADA and Brian VK2ZCQ. They're still arguing over who should get which pages.

On Sunday night, after the presentation of prizes, the crew retired to the Chinese restaurant in the bowling club for the traditional farewell feast.

If you don't win any prizes at the convention, you could always vent your frustration canoeing the Bellinger River on Easter Monday. Glide through clear water, observing eels and catfish at play. See blue cranes lifting off against a backdrop of rainforest trees, eucalypts and tree ferns. After a barbecue lunch, there's a no-holds-barred race down the home stretch.

So, next Easter, remember Urunga. Come and join in the oldest convention in Australia, and holiday on the best strip of coast in New South Wales. There's plenty for you and your XYL!

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The XYLs enjoy a lull before lunch. From left: June VK2ADA, Marilyn VK2BUI, Elva XYL of the late VK2EP, and Robyn VK2DGT.

Urunga Radio Convention 1991: Technical Quiz

Callsign/Name:

1. How many pins are on the base of an 807 valve? Answer:
2. If an amateur used 7.12MHz on 40m, 21.47MHz on 15m, what frequency would be used on 20m? Answer:
3. An alternator with fixed field excitation is supplying 240v at 50Hz to a 100Ω load. If a 15μF capacitor is connected in parallel with the load, the output voltage will:
   (a) Not change (c) Decrease
   (b) Increase (d) Double in frequency
4. A 100w, 13.8v, 50Ω broadband HF PA stage using MRF 454 transistors would have a turns ratio on the output transformer of:
   (a) 1-1 (c) 4-1
   (b) 25-1 (d) 1-25
5. The callsign of the winner of the 1951 "Urunga Scrambles" was? Answer:
6. The original wheels fitted to the "FJ" Holden were:
   (a) 13" (c) square:
   (b) 14" (d) held on with 5 nuts
7. The callsign of the amateur here today said to have a one-kilowatt handshake? Answer:
8. What is 2 when it is 0 and 9? Answer:
9. What frequency in kHz has the same numerical value as its wavelength (l) in metres? Answer:
10. What is the frequency in Hz of the musical note A at concert pitch? Answer:
11. Which of the following was the CPU in the original "IBM PC"?
    (a) 6809 (c) 8088
    (b) 6800 (d) BC547
12. What is the charge of an electron?
    (a) $1.50 ea or 10 for Y1000 (c) 6.02×10^{23}
    (b) 1.6×10^{-19} (d) $1E_0$
13. What is the typical material a Gunn diode is fabricated from?
    (a) Silicon (c) Tri Nitro Toluene (TNT)
    (b) Germanium (d) Gallium Arsenide
14. What is the total size (in terms of memory) of variables that can be defined in Turbo Pascal compiled upon a "286" type PC?
    (a) a little less than you always need (c) 64k
    (b) 640k (d) 170

15b. Name the most useful one and why?

16. How many "C cell" type batteries are used to power the original FT290R portable VHF transceiver? (Hint: foxhunters sometimes use these)
17. Given $I=I_0(e^{qV/kT}-1)$ is the current characteristic of a pn junction diode. What does the band on the diode case indicate?
    (a) That is a good one! (c) To signify which end is the cathode
    (b) It is mourning for the valve it replaced (d) To indicate the "safe" area for static-free handling
18. Given that optical-fibre-based telecommunications are replacing coaxial-cable-based systems, why is this so?
    (a) A dramatic shortage in low-loss coaxial cable due to increased 6mx activity, just ask John VK2BUI!! (c) Wideband response of coax (d) None of the above
    (b) Lower loss optical fibres. Typically 0.6dB/1km

The Story of the Erratic Hand-Held

KEITH GOOLEY VK5BGZ
LOT 15 TENAFEATE CRT
ONE TREE HILL 5114

WHAT FOLLOWS IS AN account of a problem with a wayward 2m hand-held transceiver, namely an Azden PCS-300.

In retrospect, I see now that it all started with a short in the battery charger socket and, as you well know, nicad batteries are capable of delivering quite a hefty current into a short circuit, sufficient to burn up wiring in a hand-held. But more of that later.

The burnt wiring was repaired, and all seemed well, or so I thought. A year or two later, the transceiver started acting strangely. After a few minutes correct operation from cold switch on, it gave the appearance of non-existent button pushes of the keypad. It would give spurious beeps on its piezoelectric buzzer, then, after a time, refuse to respond to the keypad at all. I thought the micro-controller might have gone U/S. I looked at the waveforms on the keypad scanning lines with a CRO, having verified that the clock oscillator was going okay. At first the waveforms looked fine with the micro scanning the keypad every five milliseconds or so. But, then the waveform started to become distorted and erratic, coincident with the spurious beeps. It had all the hallmarks of a crook micro-chip.

Contacting the agents in Sydney produced no satisfactory result. I contemplated getting a letter to the Japanese manufacturer translated into Japanese, but then saw an advertisement in *QST* magazine for Azden transceivers. The agent gave his address, naturally, so I wrote to the US and subsequently bought a new microchip for the rig.

All well now, you ask? Not so. They sent the wrong chip, didn't they? A fact I found out after laboriously removing the supposedly faulty chip and fitting the new one. The device comes in a 48-pin plastic leaded chip carrier for surface mounting. The replacement device caused the rig to act most strangely or to not act at all. A further check with the CRO revealed that the keypad scanning waveforms were on quite different pins from the original.

Another letter to the US brought a prompt response in the form of a replacement chip, this time the correct one. Remove the IC again, all 48 leads at 50,000 spacings, and fit the correct one. Turn the set on with trepidation, and oh joy! it worked. Then, after a short time, a spurious beep, and the same symptoms returned; lots of spurious beeps and erratic operation. Gloom!

Put the rig away and think about replacing the whole microcontroller and display board with hard-wired logic. But now I had a supposedly working microchip (the original), so I wired it up on a piece of copper-clad board with a clock crystal and power supply, and examined the keypad scanning lines. They were stable and solid as a rock for hours.

So, back to the rig itself. Something had to be causing those spurious beeps. Figure 1 shows part of the CPU circuit with the keypad. Remember those burned wires I mentioned at the beginning of this article? Well they were PVC insulated. When PVC burns, it gives off hydrochloric acid. I had noticed some tarnished screw heads some time after the burn up but I hadn't noticed the corrosion occurring between two solder pads on the back of the micro-keypad PCB until now. On looking at the transceiver again I saw the grey powder between the very closely spaced pads.

Using a stiff toothbrush to brush the corroded pads, and a number of others which looked suspicious, brought the unit back to life. The grey powder had lowered the resistance between one of the keypad scanning column lines and a row line to the extent that the CPU thought a button was being pressed at first intermittently, then continuously. Needless to say I was rather pleased after 18 months of despairing of ever getting the rig working properly again.

So, there we have it. Burning PVC gives off hydrochloric acid, which settles itself in minute amounts through the set and can cause all manner of problems. The lesson we can learn from this is, if PVC wire burns in a set, look for the corrosion effects of hydrochloric acid and don't be afraid to attack one of these sets using surface-mounted components with a soldering iron. With care, components can be successfully replaced.

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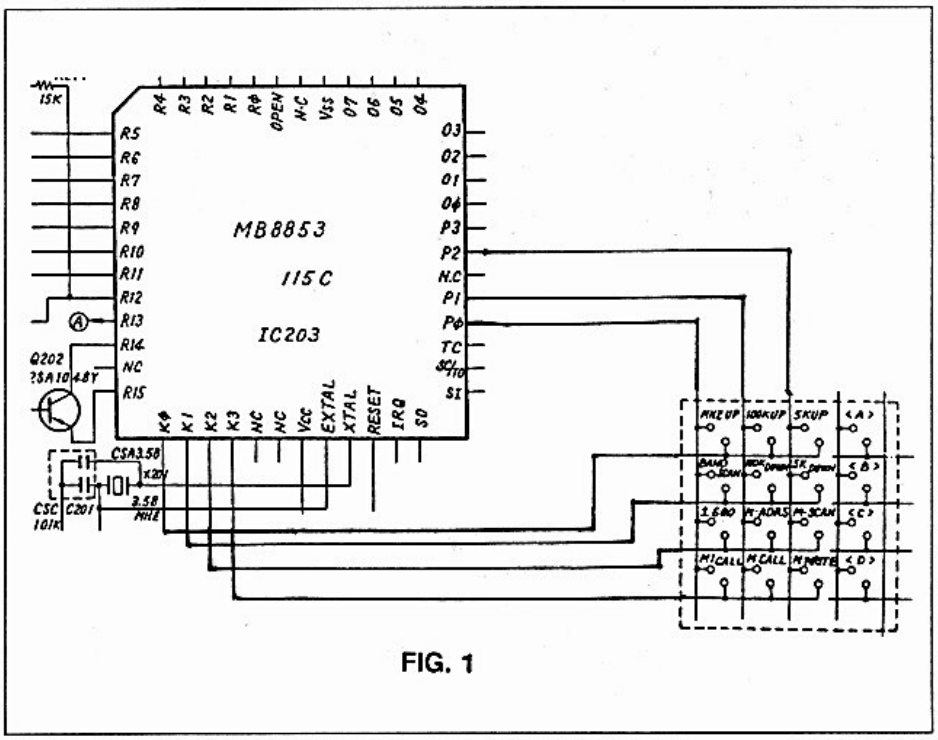

FIG. 1

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FT-4700RH DUALBAND MOBILE FM TRANSCEIVER

Features 50 watts output on 2 metres, and 40 watts output on 70cm (430-450MHz), with Full-duplex crossband operation or dual-band reception modes provided, so you can listen for calls on both bands simultaneously, or work someone on one band while also listening on the other band. The **BONUS** YSK-4700 extension cable allows the main body of the transciever to be installed remotely, while the front panel mounts conveniently on the dashboard. On the front panel the amber back-lit LCD shows both VHF and UHF frequencies and signal strengths, and all controls are back-lit for clear readability, with a dimmer switch for nightime viewing. A total of 20 memories and 5 selectable tuning steps make frequency selection easy, while the advanced scanning features allow quick detection of signals on either, or both bands. See ARA review Vol. 12 Issue 11 (Feb 1990), or A.R. review May '89.

D-3300

2 YEAR WARRANTY!

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- YSK-4700 front panel extension cable (Cat D-3301)
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SAVE $83

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B1183/PB

DON'T BELIEVE US?

'The Best of the Best!"... That's what Yaesu and Dick Smith Electronics think of the FT-1000 deluxe HF all-mode transceiver. But don't believe us- read what the experts have to say...

On documentation

"clearly written and complete, and includes a complete set of schematics and many high quality photos" — QST "The quality of printing and presentation of this book is the best I have seen..." — AR

On operation

"The layout of the front panel of the FT-1000 is just right... I reckon the FT-1000 is (operationally) far less complex than either the Icom IC-781 or the Kenwood TS-950S." — ARA "...I found the FT-1000 easier to learn and use than any other radio in its class." — QST

On the receiver

"On receive, the performance was often beyond the limit of the latest professional measuring equipment, with no measurable trace whatsoever of synthesizer phase noise." — PW "...this rig has a very strong receiver; it has the best overall performance (in terms of sensitivity and dynamic range) and the highest third order input intercept of any commercial radio ever tested in the ARRL lab." — QST* "The direct digital synthesizer works very well and produces receiver performance that sets new standards." — AR "I found the receiver in the FT-1000 to be astonishingly sensitive and immune to cross modulation on all bands." — ARA

Transmitter — SSB

"In SSB operation, the FT-1000 is easy to adjust and use... The processor adds quite a bit of punch to SSB signals; hams I worked on SSB with the FT-1000 gave me good audio quality reports." — QST "Reports were all very favourable, especially when using the speech processor." — AR "...reports of my transmitted audio were very good, even with the RF processor turned up..." — PW

Transmitter — CW

"CW keying was a delight...power output was checked in the CW mode and found to be well in excess of 200 watts on all bands..." — AR "On CW the FT-1000 was absolutely faultless." — ARA "CW operation with the internal keyer is a breeze... In QSK CW operation, the rig has well shaped and weighted keying." — QST

Transmitter — RTTY/Packet

"Using the set on HF packet was an absolute pleasure..." — PW "RTTY and packet radio operation with the '1000 are straight forward..." — QST "Packet and RTTY modes were tried and proved just superb." — ARA

Conclusion

"Yaesu's latest 'Flagship' transceiver clearly lives up to its name..." — PW "...the FT-1000 represents unbeatable value..." — AR "It is an excellent set worthy of accolades and rave." — ARA "...the FT-1000 needs little for me to consider it the ultimate contesting and DXing machine available today..." — QST*

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2 YEAR WARRANTY

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including MD-1 desk mic

Magazines

ARA — Amateur Radio Action Vol. 13, No. 2
AR — Amateur Radio August 1990
PW — Practical Wireless January 1990
QST — ARRL QST March 1991 *(review with optional filters fitted)
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Frequency: 144 —148MHz
Gain: 7.8dB
Max. Power: 200W
Max. Wind Speed: 144km/h
Length: 4.53m
Type: 3 x 5/8 λco-linear
Cat D-4850

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2m/70cm ANTENNA X-200A

Frequency: 144 — 148MHz, 430 — 450MHz
Gain: 6dB on 2m, 8dB on 70cm
Max. Power: 200W
Max. Wind Speed: 180km/h
Length: 2.5m
Type: 2 x 5/8 λ(2m), 4 x 5/8 λ(70cm)
Cat D-4860

$199

23cm ANTENNA F-1230A

Frequency: 1260 — 1300MHz
Gain: 13.5dBi
Max. Power: 100W
Max. Wind Speed: 144km/h
Length: 3.06m
Type: 25 x ½ λco-linear
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A superb wideband SWR/Power meter which boasts quality Japanese construction and a truly accurate P.E.P. metering circuit (unlike many 'other' so called P.E.P. monitor systems). The Revex W502 features solid construction with an all-metal case and a large back-lit meter... and it covers the 1.8 to 60MHz range with less than 0.1dB insertion loss. With 20W, 200W and 2kW power ranges and LED indicators which show average or P.E.P. operation. Requires 13.8V DC @ 200mA power supply.

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EA Jan, Feb, Mar '91

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Features like:

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- Microprocessor control system
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- 0.15uV typical sensitivity at 12dB SINAD
- 30kHz selectivity at -60dB
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All times are Universal Time Co-ordinated (UTC)

Beacons

At the recent SERG Convention in Mount Gambier, I was advised that VK3RMB on 432.535 has resumed operation. Also that the 70cm repeater VK3RBU is ready for operation.

Six Metres

Six metres has quietened down for many people but there are still places providing interesting contacts. One such place is Sarina where Ron VK4BRG lives. A condensed version of his log is as follows: DX FROM SARINA 30/3: 0836 KH6; 31/3: 0025 to 0041 K7KV, K6STI, P29JT; 0943 KH6; 2232 TI2HL. 1/4: 0118 to 0255 seven W7s, 0313 to 0354 N7LFX, WA7TDM, WA6BYA, K6FV, these represented a very late US opening; 0409 KL7NO and 0414 WL7X via auroral propagation with KL7NO beaming towards the Great Lakes region of Canada - no signals on the direct path! 0734 T31JA on CW worked by many VKs. Ron said they figured it out by next day that it was an April Fool's joke!! 0817 KH6IAA, 2237 YS1ECB, 2325 PJ2BR. 2/4: 0903 KH4AE Midway Is, 0921 NH6YG/KH3 Johnston Is, 2213 to 2226 eight Californian and Arizona stations, 2224 (Ron queries time) PJ9JT at 5x9 + 20dB running five watts. 3/4: 0838 KH6IAA, 2131 two W6s, 2149 WB6VIN, 0012 PJ2BR, 0211 ZL2TIC, 0933 V73AT, 0937 NI6E/KH6, 2337 N6XQ.

6/4: 0753 KH4AE, 0759 NI6E/KH6, 2159 YV4DDK, 2246 YV4AB, 2250 PJ9JT, 2317 W5GVE. 7/4: 0129 to 0157 N6CW, WA7JTM, W5VY, KF5RM, KB5KBY (?), WA5IYX, WB40SN Florida, 0205 three W7s, 0212 W5GVE, 0214 W5OZI, 0418 KF7NP and six W6s, 0846 NI6E/KH6, 2127 FO5HK, 2306 to 2341 eleven W6s. 8/4: 0831 NI6E/KH6 and again at 0802 on 9/4. 10/4: 0016 to 0026 VK6YU, VK6HK, VK6JJ. 11/4: 0848 V73AT, 0854 NI6E/KH6, 2210 N6XQ. 12/4: 0806 NI6E/KH6, 0836 AH3AB Johnston Is, 0837 KH6IAA, 0840 V73AT. From 13 to 18/4 KH6 and V73. 18/4: 2304 several W6s. 19 to 21/4: KH6, JA, KH3AE. 21/4: 2126 to 2203 nine W6s and W7s. 22/4: 0014 XE1GRR, 0023 to 0502 eighty-five (yes, 85) W6s and W7s! 22 to 26/4: KH6s. 26/4: isolated contact to W5GVE, 2155 to 2232 ZL1AKW, ZL3TIC, ZL2CD, ZL4OY all very strong. 27/4: 0050 to 0057 VK6KXW, VK6HK, VK6RO, 0150 NI6E/KH6. 28/4: 0632 NI6E/KH6, 2150 to 2207 ZL1ANJ, ZL3TIC, 2218 3D2PO, 2240 LU7DZ, 2257 ZP6XDW - possibly first ZP to VK. 29/4: 0204 NI6E/KH6, 0354 FO5NK, 2148 FO3BM, 2149 PJ9EE, 2152 3D2PO. 30/4: 0129 to 0133 VK6VB, VK6YU, VK6HK, 2230 V63JC, 2342 VK8ZWM, 2345 VS6BI heard but no two-way.

1/5: 0007 KG6UH/DU1, 2247 V63JC. 3/5: 0050 V73BQ, ZL, VK6, 3D2AG, V63. 4/5: 2055 V73AT, 2101 3D2PO. 5/5: 0014 to 0208 six W6 and W7. 6/5: 0158 to 0233 five W6. 7/5: 2221 KG6DX. 16/5: 0450 to 0503 three W6, 0753 KH6IAA, 2238 KG6SL/KHO. 22/5: 0056 to 0135 WA7FPO, WA7CJO, WA7TDZ, KF7NP, NN7K, KF0AH, KG7CE, KB6IGC, N6XQ; 2255 KG6DX.

Ron commented that the contacts to the USA on 22/5 were via an Es link-up at their end and thus were very interesting and unpredictable openings to a variety of locations. Also, he was very happy to work ZP and LU, although he had to work hard with the latter. He hoped he could work JT1CO, who was scheduled to operate from Mongolia for two weeks commencing 3/6/91.

A report on 28.885MHz said that on 3/6 between 0105 and 0130 JU1JA operating a DXpedition from Mongolia had heard the VK3SIX beacon on 50.053MHz, but no contact was made with any VK stations. This report came via JA8RC and VK3OT.

Six-Metre DXCC

From the SMIRK Six Shooter Newsletter comes advice of 18 recipients of the ARRL DXCC AWARD. Number 1 was awarded to K5FF, 2-W5FF, 3-VE1YX, 4-JA4MBM, 5-JA1BK, 6-W2CAP/1, 7-K5CM, 8-K8WKZ, 9-K4CKS, 10-WA1OUB, 11-KA1PE, 12-K1JRW, 13-JA1VOK, 14-JA3EGE, 15-JE1BMJ, 16-JE2KCP, 17-W4CKD/8 and 18-JA2BZY, JA4MBM being the first Asian operator to achieve DXCC status, SMIRK is awarding a special plaque to him and will do likewise to the first recipient of DXCC in each continent. These plaques are available because Hal Lund ZS6WB some time ago established a fund for this purpose. LU3EX has achieved DXCC, but the ARRL awaits his QSL cards.

Two Metres and Above

Aircraft Enhancement

Ron VK3AFW advises aircraft enhancement contacts continue to be made from Melbourne to VK1 and VK2 on 144.200 and 432.200MHz between 2200 and 2300 each Saturday and Sunday. If you wish to participate, you could find any of the following on air: VK1AU, VK1BG, VK1VP, VK2ARA, VK2ZRS, VK2ZAB, VK3HQ, VK3AMZ, VK3AFW and VK3XRS.

During the period 2245 to 2315 on Mondays, Wednesdays and Fridays, Gordon VK2ZAB looks for and works VK4s using this mode. Some VK4 signals have been heard by Arie VK3AMZ despite being about 30 degrees too far east for best results.

Ron says Adelaide stations should be able to use this mode to work country stations in VK2, VK3 and VK5, but their effort need to be organised. The Melbourne path may be difficult due to improper alignment of the flight paths.

Tropospheric

Andrew VK7ZHA provides the Tasmanian end for continuing weekday morning contacts on 144.100 CW to Ron VK3AFW with signals averaging S2/3 with QSB. Others to join in are Mike VK3BDL, Ian VK3ALZ and Rodger VK3XRS.

Meteor

One 10/5 meteor propagation tests were conducted between VK4ZKR and VK1BG. A number of pings were heard, but no QSOs were completed. Ron VK3AFW said during this time two longer-than-usual bursts of pings produced one-and-a-half complete callsigns at his location.

EME Contacts

Ron VK3AFW reports that on 11/5 Arie VK3AMZ completed his 34th EME contact by working W7VXW on 144.008MHz. Ian VK1BG copied W5UN and heard two other stations around 0200 on 19/5.

Doug VK3UM reports that for some time he had been waiting to work VS6BI, and finally managed a contact just before 0500 on 19/5 when Faraday rotation came good and he completed the contact in 90 seconds for one of his fastest contacts on EME.

On 18/9-5 Doug said moonrise to North America was poor. Good activity, but deep fading libration and cross polarisation changing rapidly. Europe was much better, with consistent signals.

18/5: 0200 WB0GGM, 0233 K2UYH, 0245 ZL3AAD, 0315 WB0GGM (repeat with 100 watts to four yagis), 0900 UT5DL, 0916 DF3RU, 0924 SM2CEW, 0948 LA8LF, 1000 DF9CY and 1020 DL9NDD. 19/5: 0248 ZL3AAD, 0259 V3QBVL, 0325 WA9FWD, 0345 JL1CZG, 0409 K1RQG, 0458 VS6BI, 0932 SM2CEW, 1006 LA8LF. Signals varied from 339 to 559, which indicates Doug's eight-bay array is working well.

Closure

About a month after you read this it will be necessary to be vigilant on six metres as the spring equinox approaches, bringing with it the possibility of more F2 long-distance contacts. Don't despair, there will be some!

Closing with two thoughts for the month: "Money may not buy happiness, but it buys the kind of misery you can enjoy", and "A budget is what you stay within if you go without." 73 from The Voice by the Lake. **ar**

50-54MHz DX Standings

DXCC countries based on information received up to 5 June 1991. Crossband totals are those not duplicated by six-metre two-way contacts.

Column 1: 50/52MHz two-way confirmed contacts
Column 2: 50/52 MHz two-way worked
Column 3: Crossband 50/52MHz to 28MHz confirmed
Column 4: Crossband 50/52MHz to 28MHz worked
Column 5: Countries heard on 50/52MHz.

Callsign	1	2	3	4	5
VK4ZJB	78	78		4	
VK3OT	76	81			2
VK4BRG	71	79			
VK2BA	62	63		4	
VK2QF	62	63			
VK4ALM	62	66			
VK4ZAL	55	58			
VK4ZNC	53	61			
VK8ZLX	45	60			
VK3AMK	45	47			
VK8GB	42	42			13
VK3AWY	34	36			
VK5RO	31	34			
VK3NM	31	34			
VK5LP	31	33			9
VK3AUI	27	28			
VK6RO	27	28		4	14
VK2DDG	25	26		2	13
VK6HK	23	32		1	3
VK4KHZ	23	24			
VK3XO	23	25			2
VK4TL	22	23			
VK2KAY	21	23			
VK2BNN	20	21			
VK4BJE	19	25			
VK7JG	18	20			2
VK3TU	17	19			
VK4AYX	17	17			
VK9XT	17	17		4	
VK2ZRU	16	19		4	
VK9YT	12	14			
VK6OX	10	10		1	1
VK5KL	6	11		1	14
Overseas					
JA2TTO	48	48		9	
YJ8RG	25	25			

The next list is planned for the February 1992 issue. Copy to me by 15 December 1991, please. Some amateurs have responded with the photocopies or certified lists of their QSLs as I earlier requested. I await the others, please. If you cannot obtain ready access to a photocopier, then why no have your cards vetted and certified by two other amateurs, preferably WIA members.

A perusal of the ARRL DXCC Countries List as it appears in the WIA Call Book indicates that for DXCC purposes, contacts with VK9 (New Guinea) prior to 15/9/75 and P29 (Papua New Guinea) after that date constitute separate countries!

Originally I doubted this claim, although it appears to be so stated in the call book. John VK4ZJB wrote to the ARRL and its reply indicated it would accept two countries, one deleted and one current. Earlier listings in QST apparently showed information such as 310/314, which means 310 current countries or with deletions 314. I am told present lists show only the full total, eg 314.

On that basis it seems that for the Standing List two claims for that country will be acceptable, either side of 15/9/75. Those who have already claimed both have been duly credited. Those who wish to claim need to send proof of contacts. **ar**

AMSAT

Maurie Hooper VK5EA
11 Richland Road Newton 5074
Packet: VK5EA@VK5WI

National Co-ordinator
Graham Ratcliff VK5AGR
Packet Address: VK5AGR@VK5WI
Information Nets
AMSAT Australia
Control: VK5AGR
Amateur check in: 0945 UTC
Sunday bulletin commences: 1000 UTC
Primary frequency: 3.685MHz
Secondary frequency: 7.064MHz
(7.064MHz is the frequency presently in use)

AMSAT SW Pacific 2200 UTC Saturday, 14.282MHz

Participating stations and listeners are able to obtain basic orbital data including Keplerian elements from the AMSAT Australia net. This information is also included on some WIA divisional broadcasts.

AMSAT Australia Newsletter and Computer Software

The excellent AMSAT Australia Newsletter is published monthly by Graham VK5AGR on behalf of AMSAT Australia and now has over 310 subscribers. Should you also wish to subscribe, send a cheque for $20 payable to AMSAT Australia addressed as follows: AMSAT Australia, GPO Box 2141, Adelaide 5001.

The Newsletter provides the latest news items on all satellite activities and is a "must" for all those seriously interested in amateur satellites. Graham also provides a software service in respect to general satellite programs made available to him from various sources. To make use of this service, send Graham a blank formatted disk and a nominal

RS 12/13 FREQUENCIES

HR AMSAT NEWS SERVICE BULLETIN 166 02 FROM AMSAT HQ
SILVER SPRING, MD JUNE 15, 1991
TO ALL RADIO AMATEURS BT

RS 12/13 Radio Frequency Guide & Beacon Data

		RS 12	RS 13
MODE "A"	uplink	145.910-145.950	145.960-146.000
	downlink	29.410- 29.450	29.460- 29.500
	beacon	29.4081 (or 29.4543)	29.4582 (or 29.5043)
MODE "K"	uplink	21.210- 21.250	21.260- 21.300
	downlink	29.410- 29.450	29.460- 29.500
	beacon	29.4081 (or 29.4543)	29.4582 (or 29.5043)
MODE "T"	uplink	21.210- 21.250	21.260- 21.300
	downlink	145.910-145.950	145.960-146.000
	beacon	145.9125 (or 145.9587)	145.9622 (or 145.9083)
MODE "KA"	uplink	21.210- 21.250	21.260- 21.300
		145.910-145.950	145.960-146.000
	downlink	29.410- 29.450	29.460- 29.500
	beacon	29.4081 (or 29.4543)	29.4582 (or 29.5043)
MODE "KT"	uplink	21.210- 21.250	21.260- 21.300
	downlink	29.410- 29.450	29.460- 29.500
		145.910-145.950	145.960-146.000
	beacon	29.4081 (or 29.4543)	29.4582 (or 29.5043)
		145.9125 (or 145.9587)	145.9622 (or 145.9083)

Autoanswer "Robot"

MODES	A; K; T; KA; KT	A; K; T; KA; KT
uplink	21.1291 and/or 145.8308	21.1385 and/or 145.8403
downlink	29.4543 and/or 145.9587	29.5043 and/or 145.9083

TECHNICAL DATA

	RS 12	RS 13
DC POWER:		
All system OFF	4.6 W	3.5 W
All system ON (max. output)	35 W	25 W
RF OUTPUT POWER:		
Beacon and "Robot"(low/high)	0.45/1.2 W	0.45/1.2 W
Transponder TX (29 or 145)	about 8 W	about 8 W

donation of $10 per item to AMSAT Australia, together with sufficient funds to cover return postage. To obtain details of the programs available and other AMSAT Australia services, send a SASE to Graham.

UoSAT-2 News (from SpaceNews)

Here is a recent UoSAT-2 On-Board Computer (OBC) status report:

UoSAT-2 OBC Status Information

Diary Operating System V3.1 SMH MLJM MSH

Today's date is 29/6/91 (Saturday)
Time is 0:50:10 UTC
Auto Mode is selected
Spin Period is - 304
Z Mag firings = 0
+ SPIN firings = 140
- SPIN firings = 80
SEU count = 1502
RAM WASH pointer at D07D
WOD commenced 29/6/91 AT 0:0:8
with channels 10, 11, 19, 29
Last cmnd was 109 TO 0, 0
Attitude control initiated, mode 1
Data collection in progress

In addition to this status report, UoSAT-2's telemetry report indicated a total of seven primary OBC errors and a total space dust count of 166 during the 4.84-second telemetry sample period. These values are higher than "normal" and can probably be attributed to high solar activity.

The space dust experiment is similar to what was flown on the GIOTTO spacecraft and was built by a group of students at the University of Kent, England. It uses a dialectric diaphragm which, when punctured by a large particle, discharges the capacitance associated with it, thereby indicating the impact. This works in conjunction with a piezo electric microphone which detects particles of a smaller size.

WO-18 Status Report

HR AMSAT News Service Bulletin 173.02 from AMSAT HQ

Silver Springs, MD 22 June 1991

To all radio amateurs BT

WA3PSD provided A Webersat-Oscar-18 Status Report

There has been a bit of unexpected behaviour observed on WO-18 the past week. If it continues so, it will be quite a timely development. Rotation about the Z-axis has begun to accelerate. For a period of months, the spin rate seemed stable at about one rotation every 21 minutes. It clearly was not. The latest whole orbit data collection unmistakably indicates a change to around one rotation every 10 minutes. This casts doubt on the accuracy of what had been evolving as the most popular theory (asymmetry in shape and moment-of-inertia of the spacecraft) to explain why spin slowed originally. It's too soon to discard it, though. But no matter. This is good news. ALL passes across the magnetic equator now are yielding earth-pointing attitudes. And, perhaps not surprisingly, we now have aboard and in memory five separate valid (non-dark, non-washed-out, ie detailed) pictures. The best I've seen so far is picture #6, which is the usual wispy clouds (store-and-forward meteorology from space with imaging equipment priced less than $10,000 IS possible). We will try to default to it as often as possible during the next few days, but if your QTH is within a footprint including Utah, you will also be getting the other pictures as we download 'em to see what's in 'em. We will always try to reset picture #6 transmitting before the end of our passes here. If you are on the east coast, picture #6 will probably be what you see. We intend to start shooting more within a week, but we'll always try to keep picture #6 or something interesting coming down as long as the Single-Event-Upsets (SEU) stay out of the synch fields.

And, now the really good news. Again, if this rotation sustains itself, it produces a substantial increase in the probabilities that we will have had a sunward pointing attitude at some point during shadowing in the eclipse on 11 July. I had intended containing our shoot conditions during the event to large current generation from the +Y array, and very low amounts from the other arrays. With essentially no rotation before, we were stuck with just hoping to be lucky enough to have +Y pointing properly during shadow traversal - and shooting then. With this new rotation rate, there are better chances for that to happen. I expected to use a nine through three mix of pictures with nine constrained to shoot the sun (with only 10 seconds between picture constraint waits) and three pictures constrained to shoot the Earth with what will be lower light levels. Picture #9 will shoot with different camera iris values. We certainly know more now about the iris than we did, but we don't have much experience shooting the sun so nine different values are probably in order.

Enjoy. 73s, Chris Williams WA3PSD
WO-18 Operations Manager

ar

```
      2-Line Orbital Elements   (Sat 180.AMSAT)  June 29, 1991

DECODE 2-LINE ELSETS WITH THE FOLLOWING KEY:
1 AAAAAU 00  0  0 BBBBB.BBBBBBBB  .CCCCCCCC  00000-0  00000-0 0  DDDZ
2 AAAAA EEE.EEEE FFF.FFFF GGGGGGG HHH.HHHH III.IIII JJ.JJJJJJJJKKKKKZ
KEY: A-CATALOGNUM B-EPOCHTIME C-DECAY D-ELSETNUM E-INCLINATION F-RAAN
G-ECCENTRICITY H-ARGPERIGEE I-MNANOM J-MNMOTION K-ORBITNUM Z-CHECKSUM

AO-10
1 14129U 83 58  B 91173.05914142 -.00000000  00000-0  99998-4 0  6782
2 14129  25.7941 139.3114 6032798 252.4433  36.2637  2.05882678 32349
UO-11
1 14781U 84 21  B 91174.09087683  .00001883  00000-0  34349-3 0   323
2 14781  97.8872 218.7097 0013099 146.4442 213.7574 14.67044935330314
RS-10/11
1 18129U 87 54  A 91175.05916594  .00000080  00000-0  81903-4 0  6908
2 18129  82.9269  53.7824 0011792 160.1059 200.0552 13.72194565200537
AO-13
1 19216U 88 51  B 91173.75313884 -.00000192  00000-0  86587-3 0  2758
2 19216  56.7478  87.7149 7196447 257.5679  20.2672  2.09706085 23149
FO-20
1 20480U 90 13  C 91175.39441778  .00000018  00000-0  70548-4 0  2342
2 20480  99.0290 156.1836 0540184 285.2432  68.9574 12.83183140 64485
AO-21
1 21087U          91175.16264941  .00000120  00000-0  11471-3 0   939
2 21087  82.9417 228.5594 0033828 239.4483 120.3325 13.74390104 19986
RS-12/13
1 21089U 91  7  A 91174.83113993  .00000135  00000-0  13233-3 0   935
2 21089  82.9234  99.1855 0027752 262.6262  97.1735 13.73906619 19058
UO-14
1 20437U 90  5  B 91174.73368879  .00000557  00000-0  23688-3 0  3944
2 20437  98.6652 254.1473 0011185 144.4280 215.7823 14.29159191 73928
AO-16
1 20439U 90  5  D 91174.41835947  .00000521  00000-0  22081-3 0  2926
2 20439  98.6714 254.1774 0011992 142.6516 217.5467 14.29243349 73881
DO-17
1 20440U 90  5  E 91174.59824628  .00000578  00000-0  24279-3 0  2927
2 20440  98.6721 254.3469 0011938 142.1292 218.0731 14.29330727 73900
WO-18
1 20441U 90  5  F 91175.76813716  .00000492  00000-0  20869-3 0  2892
2 20441  98.6715 255.6194 0012698 139.7941 220.4173 14.29373111 74080
LO-19
1 20442U 90  5  G 91172.52230334  .00000563  00000-0  23638-3 0  2899
2 20442  98.6718 252.4514 0012822 149.1026 211.0911 14.29447928 73627
MIR
1 16609U 86 17  A 91174.59157206  .00023940  00000-0  32068-3 0  5504
2 16609  51.6036 255.1588 0004049  27.7183 332.4514 15.57846771306163
HUBBLE
1 20580U          91175.00187178  .00003199  00000-0  32553-3 0  4785
2 20580  28.4712  38.6836 0005125  29.1632 330.9244 14.87941341 63333
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REPEATER LINK

WILL MCGHIE VK6UU @ VK6BBS
21 WATERLOO CR LESMURDIE 6076

Regulation Changes

The WIA and, in particular, FTAC, have been tackling the difficult problem of repeater regulation over the past couple of years.

Having been a part of the effort to see sensible repeater regulations adopted, I can sympathise with the WIA and its efforts to bring about change. Not just the adoption of more regulations to overcome regulation anomalies, but genuine change in the concept of what the regulations should be.

The future is at long last looking brighter than it has ever been. Rather than regulate an experimental hobby in finite detail, broaden the regulations to apply only to frequencies, emissions, message content and interference, let the amateurs themselves, via their elected representatives, decide the fine detail.

So many problems with the present regulation system exist that experimental repeaters and link systems are buried under a mountain of regulations. To give one such example: building a link system between two or more repeaters is complex, at least that is the way I have found it to be. With one side of the UHF link built and under test before it is placed into service, the amateur designer cannot place it on air and talk through it. A link can only be used to talk to another link, not an amateur using the UHF link frequency direct. Amateurs may not be aware that 420.0MHz to 421.0MHz and 440.0MHz to 441.MHz are not for normal amateur use. An amateur licensed to operate on this band can in effect not use this portion of the band. Doing so may place you on a repeater link frequency and, as a result, in communication with a novice operator using a 2m repeater, linked to another 2m repeater.

This restriction of not being permitted to use a link frequency to talk into a repeater needs further thought. Say you live between two linked repeaters but have poor access to one or both of these repeaters, or UHF equipment only. However, the UHF link, due to its directional antennas, has a good signal at your QTH. As the regulation now stands you cannot use the UHF link frequency to talk into the repeaters.

The bottom line to all this is that it is contrary to what amateur radio is all about - experimentation. The effort that John Martin (Chairman of FTAC) is putting in to sort this situation out is greatly appreciated in VK6.

There must be many repeater groups and individuals out there planning and building link systems for some of the existing repeater network that already is in place.

How about sharing some of your ideas with the rest of the amateur world? Put your concepts on paper and send them to me for inclusion in Repeater Link.

In VK6 considerable time has been spent on discussing what repeaters should be linked, how they are to be linked, and how best to interface with the end user, you the amateur. It may sound easy to link the odd repeater together, but it has not proved to be, at least not in VK6. So many options present themselves. To give an example: when linking two repeaters together, firstly are they suitable to be linked in terms of the type of use they receive? Should the link be permanent or user determined? Are there times when each of these options may be required? A user-determined link may be required to be linked permanently for a period of time. If a link is user determined, once the QSO has finished should it be left up to the amateurs to then disconnect the link, or should it time-out after a period of no use? What code control will be required by the amateur to understand in order to access link systems?

Apart from a lengthy paper from Will Scott VK4XP, I have seen no other ideas on all these interesting options. Any thoughts on how your repeater group is looking at linking could advantage other repeater groups.

Limited Access

If I told you that a new amateur transceiver was coming on the market, but it covered only a third of the band, what would you think?

Well, this silly situation already exists with transceivers for the 70cm band. They don't cover the whole 30MHz from 420MHz to 450MHz, but only 10MHz from 430MHz to 440MHz. Even though these transceivers are capable of operating on the whole 70cm band, they are deliberately restricted by the programming of the internal CPU. In most cases, it is a simple hardware change by removing or adding a diode or two to gain access to the whole 70cm band, so why the limited access?

The reason is that, with the restriction removed, these transceivers can now operate outside the amateur band, and be used in a service they are not licensed for.

My interest in having access to the complete 70cm band is for the development and testing of link systems, which operate between 420.0MHz to 421.0MHz and 440.0MHz to 441.MHz. This is a legitimate use, but is it legal?

The next generation of transceivers may have internal masking of the CPU chips that will be impossible to modify. What you get frequency coverage wise is all you can get. To whoever decides these things, please allow access to the whole 70cm band and not just a third of it.

The ridiculous outcome of not having access to the entire band could be that amateur radio may lose a part of the 70cm band. ar

SPOTLIGHT ON SWLING

BY ROBIN L HARWOOD VK7RH
52 CONNAUGHT CRES WEST LAUNCESTON 7250

The first of July saw a significant alteration to the worldwide maritime allocations. As mentioned in last month's column, the International Telecommunications Union agreed that there would be changes internationally on that date to HF maritime allocations. Already I have noticed that the Coast Station telex portions have shifted a few hundred kilohertz downwards in each allocation. Now they are within 50kHz or less from the ship's telex allocations.

The former sub-bands are quiet, with a few A1A marker signals from fixed stations slowly appearing. Only a few telex stations are left there, presumably waiting for new frequencies or crystals. The Radphone allocations have increased slightly, with the channel allocations altering by a few hundred Hertz. For example, I have noted VIT in Townsville listening for calls on 8176kHz, at very good levels here in Launceston.

As mentioned last month, Kol Israel in Jerusalem was going to significantly reduce English language broadcasts on shortwave. For a while, there were reports that this was not going to happen. But a spokesperson for Kol Israel confirmed that the cuts were very likely to go ahead. The reasons for the cutbacks are budgetary. There were hopes, even then, that there would be a last-minute reprieve of the English language service, particularly in view of the outcry from overseas listeners.

Another international station on shortwave closed down recently. Radio Peace and Progress in Moscow, which has been on-air since 1963, closed down suddenly at the end of April. Most of the programmers have been absorbed into Radio Moscow, or have commenced work in the new independent stations which have been rapidly springing up within the USSR. This station was operated by the Central Committee of the Communist Party, whilst Radio Moscow was a part of the Soviet broadcasting service. They broadcast mainly in English, Spanish, Portuguese, Creole, Chinese and Guarani (a South American dialect). Surprisingly, the majority of their programming was in Chinese.

And, while we are on the Soviet Union, there have been developments on the broad-

casting scene. Some independent stations are springing up, particularly in Russia and the Baltic republics. The most popular station in St Petersburg (formerly Leningrad) is Radio Rock on FM. Although the sender is near that city, the studio is actually in Oslo, Norway. The audio is fed by satellite to the sender. The station will probably have opened the sender within Moscow by now. They aim to have a string of stations across the USSR. The station was started by former staffers at Radio Moscow, Radio Peace & Progress and domestic radio networks and, as its title suggests, broadcasts rock music in a commercial format.

Other entrepreneurs have plans to also start commercial broadcasts by leasing time from the existing Soviet transmitters, many of whom were former jamming senders. One American/Soviet effort is reportedly beginning in September. However, there were plans for a joint venture on Radio Moscow last year for a semi-commercial format on the North American Service which, for some reason, didn't materialise. Radio Moscow World Service has been airing commercials for Soviet enterprises for a couple of years now.

It is significant that there continues to be cutbacks in Radio Moscow programming, with several languages being axed. Several Indian and African languages, plus Tagalog used in the Philippines, haven't been heard lately. As well, many language sessions have been reduced by half.

Well, that is all for this month. Don't forget, if you do have any news, please drop me a line to the above address, or leave a message on packet as follows - VK7RH @ VK7BE-1. Until next time, the very best of listening, and 73.

ar

POUNDING BRASS

Gilbert Griffith VK3CQ
7 Church St Bright 3741

This month we are given the opportunity to polish our procedures with the help of the RD contest on 17th and 18th. I have been listening to the broadcasts lately (on account of rain) and know that both VK3 and VK2 are encouraging members to participate for their respective states, and I assume other states have similar aims. The RD contest also provides morsiacs with an ideal environment in which to test and improve our operating procedures (as I have expounded over the past couple of months), where there is a friendly and relaxed atmosphere in the midst of a world-class competition. Beginners will find this an easy way to recognise callsigns and especially numbers of which there are plenty!

If you have not tried your hand at contesting in the past, this contest is an excellent one to begin with, provided you prepare yourself and your equipment accordingly. You have only two weeks, so the first thing to do is READ THE RULES. *(See page 40)* Once you understand the rules you can sort out the paperwork that you will need "on the day". Depending on the contest and the individual rules, you will need log sheets with the columns ruled out as appropriate. I prefer to use separate sheets for each band, and if (by some improbable chance) I wanted to work both Cw and voice, I would use separate sheets for each mode as well. It is then quite simple to scan (by eye) each band's sheet for duplicates as you are listening to callsigns on the air. I think that this way is faster than using a computer, as your brain does not need to have the information entered by hand for each contact, so your hands can be occupied with the keyer and radio controls at all times, and with a pen when receiving. I'm not trying to give the impression that the RD is an especially hard contest regarding workload; it isn't. In fact, I usually manage a rag-chew now and then, especially late at night, but it is worthwhile getting the paperwork right first.

Two weeks (assuming you are reading this at the beginning of the month) should be ample time to ensure that your station is ready for anything. Once you have decided which bands you will work, you will need to check the antennas for each band, making sure you can switch between them easily, and that they are tuned for the section of the band you will be using. If you don't have tuned antennas for each band you can build simple dipoles in a day or two. I suggest dipoles because you can cut two or three sets for each feedline and hang them all from a single mast. I don't recommend beams or other highly directional antennas for contests because of the time needed to swing them. A delta loop on 7MHz or higher is excellent, but unless you are working overseas dog-piles, a beam always seems to be pointed the wrong way whenever you hear a station that you want to contact in a hurry. I have one dipole tuned to 1820 and 3520kHz, and one dual dipole (one feeder) on 40 and 30 metres. For this contest I would add a delta loop for 20 and 15, and maybe also 10 metres, as this seems to work best at this location. Whatever you use, it is essential that you be able to change bands quickly with as little fuss as possible, even to the extent of using a tuner and having all the settings tabled for reference, as I do with my long-wire, my favourite antenna.

I usually arrange to have two keyers ready to use with fresh batteries, as I can leave both connected to the rig at the same time, with a straight key for further backup. My rig is run off the mains, but I can connect batteries in about five seconds if needed. I don't have a spare rig, unfortunately, unless you count the homebrew QRP! If your rig has memories, you can enter appropriate frequencies for each band into the memories to further save time when operating.

Whether you enter the contest or not, I hope this has been helpful to you in setting up your station for any event, be it contest or emergency. But one last point ... no matter how small ... SEND IN YOUR LOG or, for this contest, as indicated by the new rules, you need only to send in your SUMMARY SHEET!! You will still have to KEEP a log in case it is called up by the contest co-ordinator to prove your summary sheet.

VK4 Networking on CW

Slow morse is alive and well in VK4 with three clubs and one individual operator putting out sessions four nights a week on 3535kHz from various locations throughout the state. It was hoped that sufficient clubs would volunteer to cover seven nights a week, but this did not eventuate, most pleading lack of interest among members, or operators discouraged when nobody came up on callbacks.

However, when you listen around in the evenings on 80m there seems to be plenty of interest in CW, with some clubs going to great lengths to provide training for local examination candidates. The potential is there for a statewide network of CW enthusiasts at all levels of proficiency.

The reason for appearing in this column is to seek out CW operators who would like to call back on the regular session with signal reports and general feedback. Sessions run for approximately 30 minutes, starting at 0930 UTC (some stations go to 0830 during daylight savings) followed by a brief callback on SSB. Listen for VK4WIT (Monday), VK4WCH (Wednesday), VK4AV (Thursday), or VK4WIS (Sunday). (Note - not as published in *AR).* Frequency 3535kHz. Also needed are operators in VK4 to make use of the "free" nights (Tuesday, Friday and Saturday) either in an ongoing capacity, or for a limited period. Possible uses are - another 5wpm to 12wpm session, a higher speed session or a CW training net. Ideas and suggestions regarding Morse Code training, methods of generating morse practice sessions and other items of interest will be welcomed.

Contact the Slow Morse co-ordinator via TARC, PO Box 964, GPO Townsville 4810, or call in on one of the sessions.

Sally Grattidge, VK4MDG

More on QSK (Break-In) from Tim VK4CBP

"I use a TS-430 here and it does not have QSK, only the VOX setup. Well, the relays do seem to make lots of noise, and that does make one not use short delay times for fear of doing

some damage. Anyway, recently I did a modification to the 430 which stopped the attenuator relay activating each time one went from Tx to Rx. It is now much quieter to use, and it must save the relays a bit, too. While not quite QSK, it is not bad! Anyway, the modification is quite simple, and it entails cutting the resistor, R28 (2.2k) on the X41-1470 switch unit, just behind the attenuator switch on the front panel.

I just thought some of your readers might be interested in doing this modification to make the 430 a lot smoother and quieter to use in the gentlemen's mode!

73, GIL VK3CQ
ar

HOW'S DX

STEPHEN PALL VK2PS
PO BOX 93, DURAL 2158

June was not a good month for propagation. Comments were heard daily on the bands about: M-class flares, X-class flares, satellite porton events, polar cap absorptions, major storms. Auroras were sighted near both of the polar regions, and they were seen as far north as Sydney or Adelaide.

The average 100-watt DXer had some difficulty securing a DX contact in the single sideband mode. However, those who have not yet forgotten the ancient art of morse telegraphy had no difficulty picking up choice DX on any of the bands, including the WARC bands.

Here are a few active stations on the CW section of the band. Whilst I am only giving you a sample of 20 and 15 metres, all of the bands from 160 to 10 metres are producing good CW DX. 20 metres: 3B8, 4K1, 4S7, 9M2, A22, EA9, HZ1, OX3, PJ, PZ, TA, TL, UJ, ZD8 etc. 15 metres: 9X5, CO2, FH, HP, HZ1, JY, ST2, TF, TL, XV, ZD8, 3B8, 8R, CE0, D2, FY. As you can see, there is a good selection of pickings. All you have to do is this: dust off your old key or keyer, adjust your thinking, attitude and method of operation to DX, from a group concept to individual effort; hunting "on your own". You will be pleasantly surprised by the result. Good luck!

Afghanistan - YA

Good news for those who missed the previous YA0RR Russian expedition from this rare country.

IT9AZS and other Italian amateurs intend to operate from Kabul between 12 July and the beginning of August. There will be four operators, and the activity will be in SSB and CW. They hope to use amplifiers and a variety of vertical and wire antennas. The possible callsign could be YA0AS or T6AS. Favoured SSB frequencies are: 7080, 14180, 18142, 21280, 24942, 28580 and, on CW, 1kHz up from the bottom of the band segment. QSL will be via IT9AZS.

Myanmar (Burma) - XZ

Ed Kritsky NT2X, who has helped Romeo with his previous DXpeditions, gave some further details in the various DX outlets about Romeo's proposed activity. The expedition is definitely on. Additional documentation has arrived in Moscow from Burma, and according to news received at the very end of June, the documentation was presented to the ARRL DXCC committee and was accepted by them. It seems that it is up to Romeo and the international DX fraternity to make sure that adequate funds are secured in advance to make the expedition a success. Romeo arrived in the US at the end of June for a fund-raising activity tour. The Myanmar expedition is expected to take place in August or September of this year.

Angola - D2ACA

The most important DX activity in the month of June were the Russians, who operated from Angola as D2ACA, but later under their own callsign, prefixed with D2. They were very active on the 21 and 14MHz bands, but were heard also on other bands. The lower ends of the bands were used for some high-speed CW contacts. Propagation from VK did not favour Angola very much, and not many VKs or ZLs were able to contact them. Nets were "overloaded" with hopeful waiting queues. Amplifier problems also compounded the difficulties. DX sources said that the operation closed on 24 June. QSL goes to: LZ2DF Minchi I Petkoff, K Kukuvishky 15, 5600, Troyan, Bulgaria.

DX on 24MHz

Some time ago we reported that Graham VK6RO is quite active on this WARC band. Graham is now happy to report that he has worked 200 countries on this band. He has been on almost every day since December 1982. Here are a few interesting prefixed worked by him between April and the middle of June: ZT0, HB0, FW0, VP2, 9X5, FP, PY, A71, CU2, 9L2, JU1(JT), C21, HS1, XX9. Graham thinks he is the first VK to date who achieved this. Any challengers? So, if you feel that the 10-15-20-metres are crowded and there is no elbow room, please consider the WARC bands. Antennas are easy to make, and most modern "black boxes" have provision for WARC bands. The 24 and 18MHz bands have already proved their excellent DX capability.

Penguin Islands - ZS1

The ARRL DX Awards committee has accepted the recommendation of the DXAC and added the Penguin Islands to the DXCC list, which now stands at 323 countries. QSL cards will be accepted after 1 September 1991. The Penguin Islands are administered by South Africa and are situated off the west coast of Africa. Namibia (V51) separates the islands from the South African Republic. The last activity from these islands was in December 1990 as ZS9Z/1 and QSLs are handled by OH2BH.

South Georgia - VP8

John, operating from Bird Island in the South Georgia Group (see July *AR*), now has his own callsign: VP8CGK. Arrangements have been made for him to soon receive a three-and

beam, which will make contact with this rare DX station so much easier.

South Sandwich Islands - VP8

The postponed South Sandwich Islands expedition is on again (See Sept, Oct and Dec 1990 *AR).*

Jerry AA6BB/7 announced on 15MHz DX nets that eight operators will be leaving Port Stanley, Falkland Islands on 28 November, and start operation from South Thule Island on 5 December 1991. They were to be picked up by the research vessel *Abel J* on 20 December and return to Port Stanley on 28 December. The expedition will be active on CW, RTTY, SSB and other modes. Although there is some money from the last year's postponed event, donations are sought and recommended. Send money and QSL cards to AA6BB/7.

Future DX Activity

* Nick G0ACJ will be on Ascension Island until November 1991. He uses the callsign ZD8ACJ.
* Tom LA4LN and Hans LA1SP will go to the Faroe Islands early in August, and will sign with their own callsign prefixed by "OY". Note: you will find this system to be a general rule for stations operating from a European country.
* The International Baden-Powell DX Foundation will use the callsign C30EJA during July and August on all bands.
* There will be a DX conference in Leningrad (or St Petersburg if the city's mayor has his way) between 2 and 8 August. The special event call 4L3FS will be used during those days.
* Look for FY/N4QDX and FY/KD3FK. Jan and Beth are missionaries in French Guyana. They are operating barefoot and use a Mosley Beam. QSL direct only to Jan Weaver, 35 bis Cite Cesaire, F-97300, Cayenne, French Guyana, South America.
* VE7NH/MM left Vancouver on 6 June and will arrive in Hawaii on 6 July. Doug hopes to operate from Kingmann Reef (KH5K) and Palmyra Island (KH5). QSL to the VE7 QSL Bureau.
* TL8FD is operating from the Central African Republic until the end of August. QSL to: Pat, Box 265, F-67504, Haguenau, France.
* DK4UW will be active from Corsica Island as from 2 September as TK/DK4UW.
* Bing VK2BCH advised me that he will return to Rotuma in September or October this year.

Interesting QSOs and QSL Information

Note: callsign, name, frequency, mode, UTC, month of QSO.

ZC4RF-Bob-14031-CW-0535-June. QSL to: GO3YP R T Francis, 42 Carmarthen Rd, Up Hatterley, Cheltenham, Glos GL51 5LA.

7X2FK-Mohamed-14041-CW-0454-June. QSL to: ARA QSL Service, Box 2 PO Algiers, Algeria.

FT4WC-14017-CW-1046-June. QSL to: PO Box 35, Villemandeur, 45700, France.

4J1FS-14001-CW-0639-May. QSL to: OH2BU Jari Jussila, Pilvijarvi, SF-02400, Kirkkonummi, Finland.

C30EUA-21027-CW-0500 QSL to: HB9MM USKA Section Vaudois, Box 3705, CH-1002, Lausanne, Switzerland.

XV2A-Mark-21295-SSB-0943-June. QSL to: JJ1TBB, Masumi Kawasaki, 4-36-10 Kasuga Cho, Nerima-Ku, Tokyo, 176, Japan.

CO2VG-Juan-21MHz-SSB-0405-May. QSL to: Juan A Viera, Box 9028, Habana 10900, Cuba.

V I 4 H B W

SPECIAL EVENT STATION

CELEBRATING

"THE WHALE FESTIVAL"

IN HERVEY BAY

P.O.BOX 829
HERVEY BAY 4655
QLD. AUSTRALIA

STATION	DATE			UTC	MHz	REPORT	MODE 2-WAY
	DAY	MONTH	YEAR				
SAMPLE							

GJ4KBM-Byron-21MHz-SSB-0941-April. QSL to: B Nelson, Les Marais, Route Du Marais, Saint Ouen, Jersey, UK.

7P8EG-Hans-28MHz-SSB-0737. QSL to: K0JZM Dennis M Luscomb, 510 Virgo St, Mission, TX 78572, USA.

FP5DX-Pat-14225-SSB-0627-June. QSL to: Box 4204, F-97500, Saint Pierre, France.

V63HS-Smitty-14244 SSB-1133-June. QSL to: AL7JG via the Bureau.

5W1JQ-Harry-14254-SSB-0604-June. QSL to: DL1RBH Herman Wagner, Klavgweg 13, D-8391, Obernzell, Germany.

YS1AG-Andy-14222-SSB-0616-June. QSL to: Jose Andres Goens Marmol, 5 Calle Poniente, 929, San Salvador, El Salvdaor.

3B8GA-Faizal-14240-SSB-1200-June. QSL to: Faizal Baccus, 410 Modern Square, Vacoas, Mauritius.

6W6JX-Jean Louis-1422-SSB-0522-June. QSL to: Jean Louis Pippien, Box 200, Kaolack, Senegal.

KC6MR-14205-SSB-1126-June. QSL to: JJ1TZK Kazu Nakamura, Box 32 Ageo, Saitama - 362, Japan.

P29UV-Olaf-14201-SSB-0731-June. QSL to: LA5NM Mathias Bjerrang, Box 210, N-9401, Harstad, Norway.

VE8PM-(Zone 2)-Peter-14226-SSB-1158-June. QSL to: Peter U Wollenberg, 125 Albertus Ave, Toronto, Ontario M4R1J6 Canada.

RTTY News

Syd VK2SG provides some interesting contacts during the past weeks.

* V44KAE-14082 at 0610Z. QSL to: Box 298, St Kitts, West Indies.
* FG4FI-14088-at 2325Z. QSL to: Box 205 - 97139 Abymes, Guadeloupe.
* SU1DZ-14077-at 0400 Z. This station is 9K2DZ when he is at home. QSL to: Home address.
* A41KB 21080 at 1510 Z ARQ. QSL to: ON6BY.
* HI3UD 14089 at 0409 Z. QSL to: HI3AB.
* TJ1MR 14087 at 2357 Z. QSL to: F6FNU.
* 4S74M 21086 at 1718 Z. QSL to: Box 840, Colombo, Sri Lanka.
* SN0PJ 14086 at 0525 Z. QSL to: SP4KM.
* KG4DD 14086 at 2210 Z. QSL to: Don Donley, Box 692, FPO NY, 09583-0055 USA.
* V63BN 14089 at 1138 Z. QSL to: JG1NBD.

From Here and There and Everywhere

* Murphy again. Contrary to an earlier QSL information, V85EB Brian's QSL manager is not G0AWF. (June *AR).* Brian advised me that his QSL manager is still: VK2KFS, PO Box 62, Northbridge, NSW Australia 2063.
* Earlier we published some information about the "See Australia First" net on 21185kHz. There is now additional information from Ross VK6DA, who wants to correct any misunderstandings about his net. According to Ross, the "See Australia First" net operates on 21185kHz each Sunday morning, or 2300 UTC. However, there is an independent net on 21185 as

such, operating for about three years on that frequency each day at 0100 UTC, with a secondary session at 0400 UTC, and the net controller is Ross VK6DA. The frequency of 3.603MHz is monitored most evenings at 1100 UTC. Ross hopes that this information will clarify the position.

* Christine 3DA0BX advises that the Radio Society of Switzerland has been reconstructed, and we can expect a slightly increased activity from 3DA.
* Crozet Island is very active at the lower end of the CW portion of 14MHz. There is a new alternative QSL address: F6GVH, PO Box 35, Villemandeur, 45700 France.
* Andy UA3AB offers his help in obtaining cards from the operation of 1S0XV and 3W3RR or any of Romeo's cards. His address: Andrei Chesnokov, PO Box 967, Moscow, 125299 USSR.
* C31LJ is the new callsign of Peter, who used previously the callsign C31LHJ. QSL to: VE3SUN.
* 3D2JQ is Harry VK2CCW. QSL to: DL1RBH.
* VI4ILC was a special event station operated by Laurie, from 17 to 21 June in connection with the 74th International Lions Convention in Brisbane. QSL via: VK4WIN via the VK4 QSL Bureau.
* Bing VK2BCH returned from his Rotuma 3D2VX and Vanuatu YJ0AXV trip. QSL direct only to his home call.
* 9W6WPX was active during the WPX contest. QSL to: JA0VBJ.
* SN8JP was a special event station in Poland celebrating the visit of Pope John Paul II to that country. The operator was Tony. QSL to: SP8AJK.
* It wasn't so long ago that Dave K2PBB, who was operating as ZD8DX from Ascension Island, had a bad accident and had to be evacuated to the US for urgent medical treatment. Dave was replaced at his job by Jaques W4LZZ, who was also known as V29A, 5T5ZZ, 3X1Z etc. On arrival at Ascension, Jaques obtained the callsign ZD8XX. It is very sad to hear that Jaques has now become a silent key as a result of a heart attack.
* The cards of 3X1SG are still not acceptable to the DXCC, because Edmund has not yet sent the necessary documentation to that organisation for acceptance.
* According to John N5DRV, Dennis TJ1PD is coming back to the States with his log. QSLs to: N5DRV. In the meantime, a second operator will be active as TJ1PD. Dennis intends to return to Cameroon in two years' time.
* Heard on the band, a grand old lady, Helen W8GJX, who held an amateur licence and has been operating for the past 62 years.
* If you are one of those DXers who are constantly using the International Callbooks for correct QSL addresses, you need one important tool: a magnifying glass. Recently I found that I had to recheck some of the QSL addresses provided to me by my helpers, as it is very easy to misread the address one line above or one line below the wanted one. Please check and re-check the address before you send that QSL card to its destination, otherwise it might never reach the wanted QTH.
* The Malpelo Island Expedition cards, HK0TU, are now arriving in VK.
* Gray VK4OH, net controller on the Australian end of "The Family Hour" net on 14226, says that in the first six months of this year, 151 DX stations have checked into the net each day at 1100 UTC.

Festival of Whales

Finally, do not forget the special event station in Hervey Bay, Queensland VI4HBW, which will start operating on 3 August at 2300 UTC on 14180. The station will be active during the month of August celebrating the whale festival in that town. (See July *AR*). The humpback whale is one of the favourites of whale watchers along the coast of Hervey Bay, because of its graceful antics. The humpback frequently breaches or dives out of the water, slapping the surface with its great flippers. When beginning a deep dive, it brings its huge tail clear of the water in a graceful arc. The whale is black, with light grey undersides, and attains a length of 40 to 50 feet (12 to 16m). They migrate between polar waters in summer and their tropical breeding grounds in winter, and can be seen along the east coast of Australia.

The special event station will be active on the following frequencies: 3.790, 7.085, 14226, 21205, 28495 or as near as possible. Besides the QSL card specially designed for this occasion, there will also be an award for those who work the station. To obtain the award, send your QSL card and $5 to the Hervey Bay Amateur Radio Club, PO Box 829, Hervey Bay, Queensland, Australia 4655. QSLs can be sent via the Bureau, but if you want a quick response to your card, send with your SASE to above address.

QSLs Received

Note: W=week, M=months, Y=years, FM=from, Mgr=manager, OP=operator.

4U6ITU(3W FM OP DF4UW), ZL0ADN/ZL7 (5MO FM OP HA8XX), ZL0AAD/ZL7 (5MO FM MGR HA8XX), A25/KF7E (3W FM MGR K7UP), VU2JJQ (2W FM OP), FW/VK2BEX (6W FM OP), S21U (3W FM OP VK9NS), V31SW (4W FM OP), YJ8RN (3W FM OP), GJ4KBM (5W FM OP), 8P6AM (5W FM OP), FW/SM7PKK (1Y 4M FM OP), ZK1CT (3W FM OP), Y88POL (5W FM MGR Y32WN), YJ0AXV (2W FM OP VK2BCH).

Thank You

Thank you to all those who assisted me in compiling this column. Thank you for your information, photographs, letters, QSL informations, but special thank you to: VK2BCH, VK2BEX, VK2CKW, VK2DID, VK2QL, VK3DD, VK4DA, VK4OH, VK5TL, VK6DA, VK6RO, VK9NS, V85EB, VU2JJQ, 3DA0BX, and the following publications: QRZ DX, The DX Bulletin, DX News Sheet.

GOOD DX AND 73.
ar

CONTESTS

(INFORMATION PROVIDED BY THE RELEVANT CONTEST MANAGERS)

VK-ZL-O Contest

The starting and finishing times for both SSB and CW contests are 1000 hrs UTC not 0100 hrs as stated in the July issue.

1991 Remembrance Day Contest - Rules

This contest is held to commemorate those amateurs who died during WWII, and is designed to encourage friendly participation between all amateurs and to help in the improvement of operating skills of all participants.

This contest is held annually during the weekend nearest 15 August, the date on which hostilities ceased in the south-west Pacific area.

The contest is preceded by a short opening address by a notable personality, which is transmitted on various WIA frequencies during the 15 minutes immediately prior to the commencement time of the contest. As part of this opening ceremony, a roll call of the names of those amateurs who paid the Supreme Sacrifice is read.

A perpetual trophy is awarded annually for competition between Divisions of the Wireless Institute of Australia. It is inscribed with the names of those Australian amateurs who made the Supreme Sacrifice, and so perpetuate their memory throughout amateur radio in Australia.

The name of the winning Division each year is also inscribed on the trophy and, in addition, the winning Division will receive a suitable certificate. The winning Division also holds the trophy for the next 12 months, after it is presented at the Annual Federal Convention.

Objectives

Amateurs in each VK call area will endeavour to contact other amateurs:

- in other VK call areas, P2 and ZL on bands 1.8 to 30MHz, except the 10, 18 and 24MHz bands;
- in any VK call area, including their own, P2 and ZL on bands above 52MHz, and as indicated in Rule 5.

Contest Period

0800 UTC Saturday 17 August to 0759 UTC Sunday 18 August 1991. All Australian amateur stations are requested, as a mark of respect, to observe 15 minutes silence prior to the commencement of the contest. It is during this period that the Opening Ceremony Broadcast, referred to above, will take place.

Rules

1. There will be two contest categories
(a) High Frequency (HF) - for operation on bands below the 52MHz band.
(b) Very High Frequency (VHF) - for operation on bands from 52MHz and upwards.
2. In each category there will be three sections:
(a) Transmitting phone
(b) Transmitting CW
(c) Receiving
Modes applicable to each section are as follows:
(a) AM; FM; SSB; TV
(b) CW; RTTY
(c) Receive (a) or (b)
3. All Australian amateurs (VK callsign) may enter the contest, whether their stations are fixed, portable or mobile. Members and non-members of the Wireless Institute of Australia are eligible for awards.
4. Cross Mode Operation is permitted. Cross Band Operation is not permitted excepting via a satellite repeater.
5. Scoring contacts.
(a) All contacts score one point.
(b) On all bands a station in another call area may be contacted once on each band using each mode. That is: you may work the same station on each band on phone, CW, RTTY and TV.
(c) On the bands 52MHz and above, the same station in any call area may be worked using any of the modes listed at intervals of not less than two hours since the previous same band/mode contact. However, the same station may be contacted repeatedly via satellite not more than once by each mode on each orbit.
(d) Acceptable logs for all entries must show a minimum of at least 10 valid contacts.
6. Multi-Operator Stations Are Not Permitted (except as in Rule 7), although log keepers are allowed. Only the licensed operator is allowed to make a contact under his/her own callsign. Should two or more operators wish to operate any particular station, each will be considered as a contestant and must submit a log under the individual callsign which applies to that operator.
7. Club Stations may be operated by more than one operator, but only one operator may operate at any time; ie no multi-transmission.
8. Ciphers - for a contact to be valid, serial numbers must be exchanged between stations making the contact. The serial number will comprise three figures commencing 001 for the first contact and incremented by one for each successive contact. Should the serial number 999 be reached, the serial number will revert again to 001.
9. Terrestrial Repeaters - contacts via terrestrial repeaters are not permitted for scoring purposes. Contacts may be arranged through a repeater and, if successful on another frequency, will count for scoring purposes. The practice of operating on repeater frequencies in simplex mode is not permitted.
10. Portable Operation - Log scores of operators located outside their allocated call district will be credited to that call area in which the operator takes place, eg VK5XY/2 - this score will be added to the VK2 Division scores.

Entries - a log of all contest contacts must be kept. This should be in the format as shown in the example.

A summary sheet for each category and section entered must be submitted to the RD Contest Co-ordinator showing the following information in this order as per the example shown:

Category (HF or VHF). Section (phone, CW or receiving). Callsign, name, address, total score.

Declaration: "I hereby certify that I have operated in accordance with the rules and spirit of the contest."

Signed: Date:

Only the summary sheets for each category/section entered are to be submitted. DO NOT send contest logs.

Sheets are to be forwarded to the RD Contest Co-ordinator, 2 Moss Crt, Kingsley, WA 6026. Envelopes are to be endorsed "Remembrance Day Contest" on the front outside.

Entries MUST be forwarded in time to reach the RDCC by Friday 4 October 1991. Although they are not required by the RDCC, the contest logs should be retained by contestants in case proof of claimed score is desired by the contest co-ordinator.

Example Transmitting Log

Remembrance Day Contest 1991
Callsign: VK1XXX Category: HF
Section: (1) Transmitting phone

Date Time (UTC)	Band (MHz)	Mode	Call	No Snt	No Red	Pts
0800	14	SSB	VK2QQ	001	002	1
0802	14	SSB	VK6LL	002	001	1
0805	14	SSB	VK5ANW	003	011	1
0807	14	SSB	ZL2AGQ	004	003	1
0809	14	SSB	VK4XX	005	007	1

Example Front Sheet

Remembrance Day Contest 1991
Category: HF
Section: (a) Transmitting phone
Callsign: VK1XXX Name: Joe Brown
Address: PO Box 123, Farm Orchard, ACT 2611
TOTAL SCORE
Declaration: I hereby certify that I have operated in accordance with the rules and spirit of the contest.
Signed: J Brown Date: 20.8.91

Example Receiving Log

Remembrance Day Contest
Name/SWL No: L30371 Category: HF
Section: (c) Receiving phone

Date Time (UTC)	Band (MHz)	Mode	Stn Calling	Stn Called	No Snt	No Red	Pts
0800	14	SSB	VK1XXX	VK2QQ	001	002	1
0802	14	SSB	VK1XXX	VK6LL	002	001	1
0805	14	SSB	VK5ANW	VK1XXX	011	003	1
0807	14	SSB	ZL2AGQ	VK1XXX	003	004	1
0809	14	SSB	VK7AL	VK2PS	007	010	1

12. **Disqualification.** Any station observed during the contest as constantly departing from the generally accepted codes of operating ethics may be disqualified.
13. Awards - certificates will be issued in accordance with the Guidelines for Certificate Issue Remembrance Day Contest.

Determination of Winning Division

Scores by stations in VK0 are added to VK7.

Scores by VK9 stations are added to the mainland call area which is geographically nearest.

Scores claimed by P2 and ZL stations are not included in the scores of any VK call area.

The formula to be applied to determine the winning WIA Division is as follows:

Total Contacts per Division/Total Licences per Division times the Weighting Factor.

The Weighting Factor is calculated such that should each WIA Division perform equally as well in 1991 as in the past four years (averaged) the result would be a seven-way dead-heat.

Consequently, the most improved Division will win the trophy, and also earn a revised and lower weighting factor for the following year.

Receiving Section Rules

1. This section is open to all shortwave listeners in Australia, Papua New Guinea and New Zealand. No active transmitting station may enter this section.
2. Contest Times and logging of stations on each band are as for transmitting.

3. Logs should be set out as per the example. It is not permissible to log a station calling CQ. The detail shown in the example must be recorded.
4. Scoring will be as per Rule 5 for transmitting, with other aspects of that same rule also applying.
5. Club Stations may enter this section.

1990 VK-ZL-Oceania Contest

VK and ZL results have been published (*AR* March 1991, p39). Here are the results of the Overseas Section.

Congratulations to the high scorers. Their certificates are on the way.

The Contest Manager speaks ... I was again this year disappointed with the small number of ZLs entering a log. Per capita, more VKs seem to work in contests. Over the years, the rules have been changed to make it easier for all to enter, but obviously further input from contestants is needed to increase its appeal to ZLs. On the other hand, entries from overseas are well up, perhaps partly due to the activity of ZL150A, but there is a worldwide trend towards increased popularity of contest type activities. All logs received were of high standard, many prepared by, or logged straight off, a computer. There are many programs for this purpose, but most do not have the ability to correctly score the final result as required under the VK-ZL rules, and as the result of this, some contestants will find their scores adjusted.

Here are extracts from letters received from contestants ... I would like to let you know that despite my inexperience with CW contesting, I had a great time, and I'll have another go next year, VK3AOR. Enjoyed this contest as always, VK4LT. As General MacArthur said, "I will be back," VK5ZN. Lots of fun, VK3DZM. A most enjoyable contest, conditions seemed pretty good overall. Same set-up as in previous years, IC 751 to droopy dipoles, ZL2AGY. Enjoyed working the test as always, ZM1IM.

This year it is the WIA's turn to manage the contest, and I look forward to hearing lots of activity!

John Litten ZL1AAS,
NZART VK-ZL-O Contest Manager.

Awards: Top scorer in each continent

	Phone	CW
Oceania	N7DF/NH2	YB3FEA
North America	W7TSQ	N6MU
South America	CP1FF	No entry
Europe	UT5DK	UZ1AWT
Africa	No entry	No entry
Asia	UA0TO	UZ0LWC

Top scorer in each country

Phone	CW
W7TSQ	N6MU
CP1FF	DK3KD
CT1BWW	EA5CLO
DL1KCW	G3WPF
EA7BA	HA3MQ
G5MY	HB9FR
HA3MQ	IK0ADY
HB9AAA	LA8WG
IK2LNF	OH3TY
IS0AEQ	OK2SG
LA1KQ	ON4XG
LZ1UO	SP3RBI
OH2PM	UZ1AWT
OK2KDS	UA2FU
ON8WN	UC2OL
OZ1ASP	RB5QF
PA0ZH	UI8AWX
SP3CDQ	UJ8JA
UZ1OWZ	UO5ODA
UT5DK	LY2BTA
UC1WWF	ES4MM
UD6DFF	UZ0LWC
LY2BR	JA1DAI
UA0TO	HL30AP
JA6YJS	

VHF-UHF Field Day

A log submitted by Maurie Batt VK3XEX was lost in the mail. However, he has sent another copy which has earned him second place overall, with 1283 points.

His scores were:

6 metres	225
2 metres	882
70cm	176

Congratulations, Maurie.

The photo shows Maurie's portable station in the field.

Ross Hull Contest 1991-92

A summary of the proposed rules for the next contest will be published next month. In the meantime, any comments on the proposals in April *AR* would be most welcome.

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VK3XEX Field Day and WICEN set-up.

CLUB CORNER

Amateur TV Goes Offshore

The South East Queensland ATV Group recently conducted a unique outside-broadcast between two islands in Moreton Bay, near Brisbane.

Bob VK4BOB and Brian VK4BDB set up a complete two-way vision and sound link at the lighthouse on Moreton Island, while Richard VK4XRL and Bob VK4ADN did likewise on Bribie Island. The exercise, which was carried out on Thursday 21 March, enabled primary school students to interact with teachers and students on each island.

The students normally get their education by correspondence, and this was their first experience of a classroom situation via television. A lesson on handwriting and a show-and-tell session were the highlights of the three-hour telecast.

To enable constant transmission in both directions, a 426.25MHz link was used from Bribie to Moreton, and a 1250MHz FM-TV link was used for the return path. The picture and sound quality of both links was perfect P-5s on the ATV rating scale. The distance between the two transmission sites was about 30 kilometres - mainly over water.

The operation attracted interest from at least one commercial television station, which sent a camera crew and reporter to cover the story, and there've been enquiries from other schools throughout Queensland about the exercise. The SEQATV Group would like to thank the Queensland Distance Education Department and the relevant authorities for allowing the transmission from the lighthouse area.

Peter Jones VK4YAC **ar**

DIVISIONAL NOTES

FORWARD BIAS

PHIL CLARK VK1PC

Technical Symposium

The very popular technical symposium conducted by the Canberra Amateur Packet Radio Group will be held again this year on Saturday 31 August.

The agenda has not been finalised at this time but, to whet your appetite, some of the likely subjects will be:

Repeaters of the future (combining voice and data)

High speed modems

Antenna modelling on PCs

Getting started in packet

Getting your stations on the air (HF, VHF, UHF-SSB, CW, FM)

Satellites aloft etc, etc.

The day will be jam-packed with topics from many aspects of our hobby. The symposium will be held in University House at the Australian National University and will start at 9.00am and finish around 5.00pm.

Refreshments, catered lunch and all seminar papers are included in the low $16 registration fee. Registration in advance is required in order to provide for the catering, so be early to secure your place. Registrations will close on 2 August.

Contact Gavan Berger VK1EB on phone (06) 258 5390 for further information.

Registration may be made by forwarding your name, address, callsign and $16 fee to:

CAPRG
c/o Gavan Berger
PO Box 68
Charnwood ACT 2617.

Please note that cheques should be made payable to CAPRG, and that the closing date for registration is 2/8/91. All amateurs are welcome to attend, so come along!

Demonstration Station

George VK1GB and his band of hardy helpers have been doing a great job of promoting the hobby of amateur radio in the "deep" north, with the demonstration station at the Hall markets on the first Sunday of each month. Volunteers are still needed to help man (person?) the station and to explain the equipment and hobby to anyone interested.

There has been considerable interest at the station and it has already attracted new members to the Division.

If you can help out with this station, please contact George VK1GB QTHR or via two metres.

You do not need to spend much time and you don't have to come every month, but the more we have, the less each has to do.

So, what about it? Will YOU come along and help promote amateur radio to the community? George would certainly be pleased to hear from all those who could help out.

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VK2 NOTES

TIM MILLS VK2ZTM

VK2WI Adds 20-Metre Relay: In the last notes it was indicated that the Division was expanding its HF broadcast coverage. Fifteen metres had already been added a few weeks ago and, during July, 20 metres was introduced. This will be done on behalf of VK2WI by Peter VK2OG using a frequency of 14.160MHz. This may change at a later date higher up the band; it depends upon coverage. The relay will only be on the morning broadcast, which starts at 0045 UT. With this relay there is coverage from 160m through to 23cm except for 17 and 12m; if anyone can assist, please contact the Divisional Office.

VK2WI is located at Dural in the north-western section of Sydney, and is one of the highest locations in the metropolitan area. For some years, commercial systems had been located at the site on a limited basis. It is now proposed to increase the commercial use of the site, and negotiations are currently underway. The financial return from this venture will fund the operation of VK2WI and associated facilities.

80th Anniversary Dinner: A most enjoyable evening was had by the 60 members and guests who attended Darling Harbour on 28 June.

Divisional Examinations: There is a change of date for the forthcoming August exams. They will now be held on Sunday afternoon, 18 August. Closing date is end of July. Expanded details in the broadcasts.

RD Contest: For the RD weekend there will be a broadcast from VK2WI starting at 5.15pm on Saturday 17 August, using the morning frequencies. There may be a repeat at the usual time Sunday morning, without callbacks. The evening broadcast will be as usual from 7.15pm.

Grab Bags: A limited number of bags of assorted components has recently been assembled, limit two. A bag is just under a kilo in weight, and will set you back $3. Collect from the office. If you would like them by mail, then you can get two bags plus pack and post for $10. You might as well have the two bags for the postage is the same for one or two bags. By now the ballot for the 2m hand-helds has been conducted. When these notes were being completed there was still a surplus over demand, so listen to the broadcasts to see if any remain.

Divisional Software Library: This commenced last month; the first item was a Morse Code program. Send a self-addressed 9x4 envelope to PO Box 1066, Parramatta NSW 2124 for details and operating conditions.

Spread Spectrum Group: There is interest to form a group for this mode. If you have an interest, contact the Divisional Office or Dave VK2KFU.

WICEN (NSW) Inc: This month is the annual City to Surf exercise on Sunday 11th. Coordinator is Brett VK2XMU. The Batemans Bay car rally is on 7 September. AGM at Parramatta 24 August.

Happenings: The Sydney Radio Group advises that it will not be holding its field day this year and has shifted planning to next year ... A recently formed club in Sydney is the Australian Amateur Television Club. Details from Colin VK2JCM (02) 759 8151 ... Next St George ARS auction, 14 September ... Next Divisional Trash and Treasure, 29 September.

New Members

A warm welcome is extended to the following who recently joined the VK2 Division.

S	DeFrancesco	VK2XDF	Croydon Park
G	Hancock	VK2GCH	Wauchope
K H	Harrer	Assoc	Arncliffe
H M	Martin	VK2MKB	Lyndhurst
W	Memphis	Assoc	Quirindi
A	Mollenhaver	Assoc	Wentworth Falls
L D	Smith	Assoc	Hornsby
R	Soulie	VK2ARS	Fairfield
J H	Walker	Assoc	North Parramatta

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5/8 WAVE

JENNIFER WARRINGTON VK5ANW
& ROWLAND BRUCE VK5OU

Examinations

Here is an update on the information given in this column in April. Examinations will be given at the following times and dates:

31 Aug	1pm	WIA SA Div
21 Sept	10am	Christine Taylor
26 Oct	1pm	WIA SA Div
23 Nov	10am	Christine Taylor
7 Dec	1pm	AHARS

For further information, please contact the following:

WIA SA Div
Don McDonald VK5ADD
WIA (SA Div) Examinations Officer
Ph: 276 1251 (H)

AHARS
Adelaide Hills Amateur Radio Society
Alan Haines VK5ZD (Secretary)
Ph: 276 7091 (H)
Christine Taylor VK5CTY
16 Fairmont Ave, Blackforest 5035
Ph: 293 5615 (H)

Nomination for examinations closes one week before exam dates. My thanks to Peter Koen for the above information.

Excellent Speaker Missed

The late substitution of our June speaker meant that there was little time to publicise him or his subject, which was a great shame because it meant that only a small number heard Bob Major from the Department of Mines speaking on Chernobyl and its nuclear disaster, and on the safe storage of nuclear waste. He also put a convincing argument for the use of nuclear energy over, coal etc. Bob is well versed on many subjects. I recently heard him speak on the Mt St Helens volcano and the San Francisco earthquake disasters. I hope that we will get a chance to hear him again.

In the meantime ... DON'T FORGET that Tuesday 24 September is our Display of Members' Equipment night. This is the one night in the year when members can bring along their home-built equipment, tell us a bit about it, and stand a chance of winning money or vouchers as prizes.

Although I have not had confirmation of their participation this year (and I hope I'm not putting anyone in an embarrassing position) we are usually indebted to John Moffatt VK5MG of International Communication Systems, Port Adelaide, and to Merv Millar VK5MX who presents the Millar Award and Prize for the best "newcomer" - so, get that pet project finished and bring it along to next month's meeting.

Diary Dates

27 Aug General meeting (speaker not known)
24 Sept Display of members' equipment

JENNIFER WARRINGTON VK5ANW

Jenny VK5ANM is overseas at present, so you have a few lines from me as a "guest editor".

I must say, being a council member certainly gives you a chance to try your hand at quite a wide range of jobs. I have been the QSL Bureau manager (a regular position, now taken over by Alan VK5ZN) broadcast officer (relieving), *AR* contributor (relieving, I hope), education officer, federal councillor, co-ordinator of what seems to have been a fair number of events, but in practice probably only a handful, speaker to other organisations, visitor to affiliated clubs, chairman of meetings, broadcaster, writer of letters to papers, answerer of innumerable phone calls from members, prospective member, ex-members ("let me tell you why I resigned"), journalists ("what are you hearing from the Middle East? How often have you spoken to Rajiv Ghandi?") and, on a couple of occasions even, the month's attraction at the WIA meeting. In most of these, I have been very ably assisted by others who gave me wonderful support. Yet, despite the long list, there are man others who, year in year out, do jobs for the WIA which are far more onerous, far more time consuming, far less rewarding - no, that's wrong, "much lower profile" is a better phrase - than these.

I changed the wording because it would be fair to say that, despite the occasional whinger, despite the frustration from time to time, I have found the jobs rewarding; I've learned a lot of things I wouldn't have known, I've made a lot of friends who otherwise would have been only acquaintances, if that and, indeed, I have achieved a certain satisfaction in being able, in some small measure, to put something back into this hobby of ours. So, and there has to be a "so", after all that, if you have ever considered standing for a position in the WIA, or any other organisation for that matter, and have rejected the idea, don't be afraid of the work involved, don't worry about the late hours of committee meetings, and the fact that your XYL/OM will consider you a total stranger and the kids will think you to be only a lodger, go for it; it's well worthwhile. Mind you, when all this is over next year, I'm going to put up my tower, dust off the rigs and get back on-air again to prove to all those DX friends that I am in fact not a silent key, but alive and well in one of the best places on earth. - This "editor's" decision is final, and no correspondence will be entered into.

One of those almost unsung heroes, Peter VK5PRM, BGB supervisor, auctioneer extraordinaire (the spell checker didn't like that) is also the program organiser. Despite the difficulties in coming up with a speaker or some other event each month, it looks as though he has got a bit ahead of himself, and arranged things quite a way in advance. Look out for details on the Sunday broadcast.

When you receive this edition of *AR* the involvement of the WIA in the Hobbies Fair and Exhibition at the Wayville Showgrounds will have just taken place. I hope you found time to visit it. Once again, much, nearly all, of the work has been taken out of my hands. It needed to be; I seem to be spending more and more time away from Adelaide on work-related matters. At the time of writing, details have yet to be finalised, but my thanks to all who helped make it the success I am sure it is going to be. Finally this month, although I guess it is a paragraph I could insert each edition, welcome to our new members, and congratulations to all those who have successfully taken their examinations, or upgraded. I must say the devolution of exams was a great step in making it easier to find time to sit them, and it is good to see so many potential amateurs and therefore WIA members, making use of the more flexible arrangements. **Rowland Bruce VK5OU ar**

QRM FROM VK7

FRANK MOORE VK7ZMF

The Northern Branch of the VK7 Division has seen a lot of increased activity in the past few months, thanks mostly to the instigation of Barry Hill VK7BE. Barry is the recently elected Northern Branch president.

Barry and his Executive have put to air a broadcast called *The Amateur Hour*. This is a weekly broadcast on Wednesdays 19.30 hrs local on the Launceston 2m repeater VK7RAD, with relays on VK7REC, and sound on ATV RPTR VK7 on the north-west coast.

Other activities in the northern branch are the start of lessons for the NAOCP course, which started 14 July.

Also, it produces a monthly magazine called *The Network*, which contains local news and happenings, with a section for classified ads. This is available at electronics outlets in Launceston, and from the Northern Branch at Box 275, Launceston.

Andrew VK7ZHA is conducting experiments with propagation across Bass Strait on the VHF and UHF bands. He has a group of regular contacts in VK3 on 2m and, when conditions are right, 70cm. Listen for Andrew on 144.100, 0820 local every morning.

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EDUCATION NOTES

BRENDA EDMONDS VK3KT
FEDERAL EDUCATION CO-ORDINATOR
PO BOX 445 BLACKBURN 3130

Firstly, thank you very much to those of you who have sent in comments or suggestions about the present examinations system. Input has been received from several individuals and groups, with a number of topics being raised. The general feeling from this sample is that there is significant dissatisfaction with the system, with a number of possible ways of streamlining worth considering. The WIA is negotiating with DoTC in the hope of overcoming some of the problems.

However, I have not so far received any copies of past examination papers from readers. I think it is time that some comparisons were made to see how even the standard has become. I realise that any one examining body will have tried to keep the standard of its own papers even, but there is scope for a lot of variation between groups, and I would like to have a few impartial opinions on the degree of variation.

Ever since the question banks were released a number of us have been concerned that they are too small and too unbalanced. I am now starting to make a collection of questions, both theory and regulations, for possible addition to the banks. I intend to circulate the collection for comment to a number of volunteers who are active in either classes or examinations. Consequently, I would be very happy to receive copies of questions which have been

written by readers.

However, I am being a bit pushy, and asking that if you have some to send or intend to write some specially, you check with the syllabus and the existing banks so that the new set complements the old rather than duplicating it. For instance, there is no need for more questions on capacitors in parallel. It would also be helpful if the new questions were tagged with the syllabus section and subsection so that they can be slotted in to the banks easily.

I seem to spend a lot of these notes asking for people to do things or contribute something. (I do not think I have ever asked for money, have I?). One of the satisfying features of this position has been that so many readers have taken the time to make comments or suggestions, so that there has been feedback on most of the topics raised.

So, for my last item this month, another request. The current novice and AOCP/LAOCP theory syllabuses were last revised in 1984. There was a slight amendment after the extension of the novice privileges to include some of the 2m band, but ,to my thinking, they are starting to become outdated. Some time within the next year I would like to start on another revision, and here again is an opportunity for the readers, the class teachers, examiners and other concerned amateurs to have some input to the review. The trouble is that technology has developed so much over the past seven years that it is hard to decide how far to extend the syllabus without making it much too extensive. The alternative is to delete some existing sections, but which are so dated that they are no longer applicable?

Please note, I am NOT suggesting altering licence structure or dropping the CW examinations, I just want input on the theory syllabuses. I look forward to receiving your comments and ideas.

73, Brenda VK5KT
WIA Federal Education Co-ordinator
ar

WARC-92 UPDATE

David Wardlaw VK3ADW
WIA WARC Coordinator

Proposals to go to Warc-92 are now Appearing

A number of countries, including Australia, have published their preliminary positions for WARC-92.

The CEPT (European Conference of Administrations of Posts and Telecommunications) which has 31 members, has produced its provisional views.

And CITEL (Inter-American Telecommunications Conference) has published the report of the CITEL 1992 World Administrative Radio Conference Interim Working Group.

I am now in a position to let you know the provisional proposals of Australia for WARC-92 in regard to the Amateur Service.

Australia supports a realignment of HF broadcasting allocations on a worldwide basis in relation to harmonising the amateur allocations near 7MHz, provided that there is no net loss of broadcasting spectrum.

There are no proposals for intrusions into any other amateur bands from Australia.

The situation in regard to Wind Profiler Radars is of concern to amateurs, as the optimum frequencies being quoted are around 50MHz and 400MHz, as well as 1000MHz.

As there is a problem at 406MHz with interference to Search and Rescue satellites from Wind Profiler Radars, alternative frequencies between 440 and 450MHz have been mentioned.

WARC-92, due to the limitations of its agenda, will not be in a position to make an allocation to Wind Profilers.

Australia has said there is a need for CCIR and WMO to conduct urgent studies, and for a later WARC to examine the matter of suitable bands for the operation of wind profile radar.

HF Broadcasting

The USA has proposed the worldwide harmonisation of amateur and broadcasting in Regions 1, 2 and 3.

6900-7000kHz	Fixed Amateur Change in all regions Amateur satellite Land mobile (secondary service)
7000-7200kHz	Amateur Amateur satellite
7200-7300kHz	Broadcasting Change in region 2 Amateur

New Zealand says no intrusions into amateur, amateur satellite allocations.

CEPT Position

In respect of the 7MHz situation, the administrations submitting these proposals offer the following rearrangements of the existing amateur, amateur satellite and HFBC allocations with a view towards eliminating the present regional differences and thus standardising the allocations to these services on a worldwide basis.

Regions 1, 2 and 3

6900-7000kHz	Fixed Amateur Change in all regions Amateur satellite Land mobile (secondary service)
7000-7100kHz	Amateur Amateur satellite
7100-7300kHz	Broadcasting Change in region 2 Amateur

CITEL Position

There should be no intrusions into or reduction of the amateur or amateur satellite service from 3.5MHz to 10MHz.

The broadcasting requirements have greatly exceeded the number of available channels in the allocated spectrum.

HF spectrum is essential for services other than broadcasting.

VHF and Up

The original USA proposal that 420-421MHz be allocated to the Mobile Satellite Service, which could have affected the Amateur Service in Australia, has been withdrawn.

The USA has also made proposals concerning the 2300-2450MHz band which, if accepted, may cause further restriction in access to the band by the Amateur Service, and especially the Amateur Satellite Service.

The USA has a proposed recommendation *relating to interim implementation of wind profiler radars at frequencies near 400*MHz. For WARC-92 to put forward. This could easily affect the 420-450MHz amateur band, as the frequencies have been left for the conference to insert.

ar

ALARA

JENNY ADAMS VK3MDR
70 KANGAROO GROUND RD WATTLE GLEN 3096

Each year my husband and I listen to the Sydney to Hobart and Melbourne to Devonport yacht races on the HF box, hearing ahead of the general population of incidents occurring, especially at night. Sometimes not getting much sleep with the hiss and crackle. It was with great delight I received a letter from Joan Beevers VK3BJB catching up on her activities with yachts, yacht races and JA m/m nets.

In the Melbourne to Osaka double-handed yacht race, Joan was kept busy helping the two all-female crews. Beth Higgs and Sumiyo Kaneko on the Yacht *Marina City Club* when it had rudder trouble in the Coral Sea. Joan relayed messages between them and the vessel's owner, and other contestants with helpful advice. Beth and Sumiyo finally made it to Osaka okay; after their rudder trouble, they had very rough weather due to tropical cyclone *Lisa* around the Solomon Islands/equator area, and also very strong winds around Guam, with torn sails etc as a result of typhoon No 4. Joan is sure they were glad to finally set foot on firm land after months on board the yacht. The irony of it was that when they were within 50 miles of Osaka they were becalmed and had to wait for winds to get them over the finish line at Osaka!!!

The marine radio of the other all-female crew on the yacht *Raika* gave up working, so they were not able to check into the official Penta Comstat race roll schedule every afternoon. Also, they had no idea where the rest of the Melbourne to Osaka yacht fleet were, so Joan kept a schedule with the girls every night at 7.30pm EST to relay the latest Argos positions of the leading 20 yachts, plus all the yachts in their class, Racing Division Class C when they checked into the afternoon roll call schedule on the marine band. The girls had only amateur radio for contacts to Japan; every fourth day, when it was the compulsory day for the Class C to check in, Joan would send *Raika's* position from the afternoon Japanese yacht net to Penta Comstat by fax. This daily schedule was kept up for three weeks until they arrived in Osaka.

Joan was able to go on board this year's winner of the Melbourne/Osaka double-handed yacht race (it won the 1987 inaugural Melbourne/Osaka yacht race.

When she and her family went to Victoria Dock, Melbourne to meet all the Japanese entrants they met the Japanese skipper, Mr Sugair (TJIMBY/mm) and crew member Ross Field, who was on the winning New Zealand yacht *Steinlager 2* in the last Whitbread Around the World yacht race. "Great to be able to mix with all these "famous" yacht people," says Joan.

CHEERS TILL NEXT TIME
ar

KNUTSHELL KNOWLEDGE

GRAHAM THORNTON VK3IY

A brief overview of what other magazines have to say. All of the items given below are available in the Executive Office Library. As a special service to **Members Only**, a photocopy of any complete article is available for $2.50 posted. To circumvent any copyright problems, please be sure to state - 'The information is required for the purpose of private study'. Address your request to 'The Librarian, Executive Office WIA, PO Box 300, Caulfield South Vic, 3162.'

To make life easier for our hard-working librarian, Ron Fisher VK3OM, please quote title, periodical, month and page number. eg The Logic analyser, EA, May pp 126 - 128.

Amplifiers

Linear RF

Ameriton's AL-811 Linear Amplifier. Bill Clarke WA4BLC, *73* issue #367 April 1991 pp 38, 40. il photos. A product review of a 600W PEP amplifier which uses 3 811As in grounded grid. Pi networks provide input and output matching. The reviewer points out the cost effectiveness of this product - priced at US$649, it provides a power output less than one S point down on amplifiers costing an extra $1000.

Command Technologies Commander HF-2500 Linear Amplifier. Mark J Wilson AA2Z, QST vol LXXV No 5 May 1991 pp 41 - 44. il graphs and photo. A Product review of this equipment including measured results.

The Commander II Amplifier. Jeffrey J Covelli WA8SAJ, 73 issue #365 Feb 1991 pp 54 - 55. il photos. A product review of a 2m linear amplifier with an output up to 1kW on SSB. A single 3XC-800A7 tube is used.

Small Signal

The Basic Transistor Amplifier. Peter Phillips, *EA* vol 52 No 5 May 1991 pp 100 - 103. il ccts. An educational dissertation containing information necessary to design voltage amplifiers.

Antennas

Microwave

A High-Performance UHF and Microwave System Primer. Dave Mascaro WA3JUF, *QST* vol LXXV No 5 May 1991 pp 30 - 33. il diags. The use of separate antennas is proposed for transmission and reception. A greater ERP together with better signal to noise on reception and lower cost is claimed for this system. If a dish is used, a waveguide feeder design is offered, which separates transmitted and received signals.

The Super Rover. Richard Comly N3AOG, *QST* vol LXXV No 5 May 1991 pp 26 - 27. A description of an eight-foot parabolic rotatable antenna mounted in a pickup truck. The assembly is dismantled for transportation.

Miscellaneous

Apartment Antennas: A Challenge. Stan Gibilisco W1GV, *73* issue #368 May 1991 pp 42, 44 - 45. il diags. A general discussion is given of the difficulties faced by the apartment dweller; numerous suggestions are offered to solve these problems.

Artificial RF Ground. J Frank Brumbaugh KB4ZGC, *73* issue #367 April 1991 pp 10, 12. il cct. A series resonant circuit, tuneable on all bands from 40 to 10m, which holds the transceiver chassis at zero RF potential. An 8 foot counterpoise is required; if extended somewhat, 80m can also be handled. A current transformer provides a resonance tuning indication.

Ten for 10. Michael Harris KM4UL, *73* issue #367 April 1991 pp 52, 54, 56. il diags, graph and photos. A low-cost X-beam antenna for 10m, which should cost less than US$10 to build. Tails are provided at 45° to each element; it is claimed that these reduce the incidence of minor lobes. A forward gain of 6dBd is quoted, together with a front-to-back ratio of 15 - 18 dB.

The ESV Mod Quad. Martin Beck WB0ESV, *73* issue #367 April 1991 pp 14 - 15. il diags. A design for four element quads using Acrylite plastic; construction details are given for different antennas covering a frequency range of 50 to 1296 MHz. Modifications for delta loops are also given. A gain of 10 dBi is claimed.

10 dB om 10 Meters - for Nothing (2). William Skidmore VE3AUI, *QSTVE* June 1991 pp 3 - 4. il diags. A description of a five over five Sterba array, which gives 10 dB gain. Directivity is 55° between half-power points, concentrated at low vertical angles. The antenna may be fed with open-wire line and an ATU, or via a bazooka balun and coax. This latter arrangement can be improved by a quarter wave stub, also described in the article.

Multiband

Pocket-Portable Seven-Band Antenna. J Frank Brumbaugh KB4ZGC, *73* issue #367 April 1991 pp 46 - 47. il diags. This antenna uses 7-wire flat ribbon; each of the wires is cut

for the appropriate length to cover 40 to 10m operation. The flat ribbon gives a compact, tangle free transport package. It is suitable for use as an indoor antenna, or for portable field use.

The Carolina Windom 160. (Product Review) Bill Clarke WA4BLC, *73* issue #367 April 1991 pp 34, 36. il diags, graphs and photo. This off-centre fed antenna is manufactured by The Radio Works, and can be operated with a tuner over the complete HF range. Polar plots are presented in the article.

Product Reviews

The Happy HalfSquare. Jim Gray W1XU, *73* issue #367 April 1991 pp 22 - 23. il diags and photo. A review of the AntennasWest HalfSquare antenna. It consists of a horizontal dipole with quarter wave vertical tails. The input resistance at either corner is 50Ω. A gain of 4dBd is claimed. Good low-angle propagation is reported.

VHF/UHF

Collinear for Two Meters. F W Lee G3YCC, *73* issue #367 April 1991 p 24. il diag and photo. A low-cost two element vertical antenna, which uses a quarter wave matching stub for connection to either a 50Ω or 75Ω coaxial cable.

Yagi

Mosley TA-34-M Triband Yagi Antenna. (Product Review) James W (Rus) Healy NJ2L, *QST* Vol LXXV No 5 May 1991 pp 43 - 44. An evaluation of this antenna is given, with measurements.

SV Products' WARC Band Yagi. (Product review) Drayton Cooper N4LBJ, *73* issue #367 April 1991 pp 42, 44. il diags, graphs and photos. A review of a two element duo-band trapped Yagi for 17 and 12m. The traps are of coaxial design.

ATV

FM-ATV

Future Modulation Amateur Television. Don C Miller W9NTP, *73* issue #365 Feb 1991 pp 32 - 33. il cct and photos. This article discusses the benefits of video transmission using FM instead of AM. It is claimed that a 20 to 30 dB improvement is obtained. A circuit is given for a 23cm FM-ATV modulator.

Audio

Quad 'DI' Box For Stage And Studio. (DI = Direct Injection) Rob Evans, *EA* vol 53 No 6 June 1991 pp 64 - 69. il cct, cmp, pcb and photos. This device provides buffered single or balanced complementary outputs, from signals derived from various musical instruments. The balanced output has a 20dB attenuation option, but otherwise the amplifier is unity gain. The design allows for four such units to be housed in a single cabinet; it is powered by 240V AC.

Computers

Software for the Ham Shack, Part I. Bill Clarke WA4BLC, *73* issue #368 May 1991 pp 22, 24. The initial article in a series of programs written in GW BASIC for IBMs and clones, which provide ham system calculations. Part I handles antenna and transmission line calculations.

Electronic Devices

The Copperhead Keyer Paddle. Charles D Rakes KI5AZ, *73* issue #368 May 1991 pp 9 - 10. il cct, cmp, diags, pcb and photos. A non-mechanical paddle, which uses touch-sensitive copper strips to actuate dits and dahs. The wrist and hand rest on a copper plate, to provide an earth connection. Two output transistors, each driven by a 4093 Schmitt trigger, can energize a conventional keying circuit.

The Mini Keyer. Klaus Spies WB9YBM, *73* issue #368 May 1991 pp 14, 18. il cct, cmp, pcb and photo. An electronic keyer which is based on a 555 timer and a dual 74HC73 JK flip-flop. The circuit is presented without a functional description; performance specifications are not stated.

The SR3 Simplex Repeater from Brainstorm Engineering. (Product Review) Dick Goodman WA3USG, *73* issue #368 May 1991 pp 46 - 47. il photos. A description of a store and forward simplex repeater controller. Message is retransmitted from memory store on cessation of carrier input. Various accessory functions may be controlled by DTMF tones.

Filters

Audio Notch

The J.Com MagicNotch Audio Filter. (Product Review) David Cassidy N1GPH, *73* issue #368 May 1991 p 40. il photo. A switched capacitor scanning device, which detects and notches out continuous tones. It will track frequency variation of an interfering signal.

Crystal

Simple Crystal Filters. Bill Parrot W6VEH, *QEX* No 111 May 1991 pp 10 - 14. il cct and graph. The article considers the application of low-cost computer crystals to half-lattice filter design for SSB or CW use. A simplified approach is described to achieving the best possible results without the purchase of more expensive crystals.

Transceiver

The JPS NIR-10. (Product Review) Peter Ferrand WB2QLL, *73* issue #368 May 1991 pp 34, 36. il graphs and photo. This device uses digital processing methods to recognise speech, and to produce an output which discriminates against noise. It is inserted between the receiver and speaker. A switchable bandpass option gives a sharp sided bandpass filter at pass bands of 200, 600 and 1500 Hz.

Power Supplies

Miscellaneous

Power Supply To Replace Plug Packs. Jim Lawler, *EA* vol 53 No 6 June 1991 pp 80 - 81. il cct, pcb and photos. This circuit is designed around an Arlec 7VA transformer with two independent 12V windings. Provision is made for positive and negatve regulated outputs; alternatively, each winding may be combined in series or parallel.

Series Regulated

The Series Regulator Power Supply:A Closer Look. William E Sabin W0IYH, *QEX* No 111 May 1991 pp 3 - 9. il ccts, cmp, graphs and photos. The article includes a general theoretical discussion on the design of series regulators. A specific design is offered for a laboratory power supply, using the LM723 regulator chip, and two 2N3055 output transistors. Its specifications are: continuously variable output voltage from 4.5 to 25V, continuous duty load current of 2.5A, load regulation better than 0.03% to 2A and 0.1% to 2.5A, line regulation 0.01% for 5% AC line change, AC ripple less than 2μV RMS, less than 2μV RMS random noise to 500kHz, rapid response to line and load changes, and a low output impedance. Bend over (foldback) current limiting is included.

Receivers

Simple SupeRX. Bruce O Williams WA6IVC, *73* issue #367 April 1991 pp 26, 28, 31. il cct, cmp, pcb and photo. A simple 4 IC receiver, which is operated by a tuning knob and a volume control. It receives CW and SSB, and can be built to function on either 80, 40 or 30m.

Technology

Basic Steps Towards Eliminating Telephone RFI. Pete Krieger WA8KZH, *QST* vol LXXV No 5 May 1991 pp 22 - 25. il diags and photo. A general discussion which outlines the basic steps to be undertaken to eliminate RFI problems from the telephone system. A filter choke design is offered to reduce common mode induced RF currents in telephone wiring.

Connectors for (Almost) All Occasions - Part 2. David Newkirk WJ1Z, *QST* vol LXXV No 5 May 1991 pp 34 - 39. il diags and photos. Concluding part of article, which gives wiring details for shielded phono, DIN, mike and RF plugs.

ESD - Electrostatic Discharge - Part 2. Brian P Bergeron NU1N, *QST* Vol LXXV No 5 May 1991 pp 28 -29. il diag photos. A further discussion on ESD, which expands on detail for precautions which may be taken to prevent damage to sensitive components.

Test Equipment

Bridges

The Handy Inductance Bridge. J Frank Brumbaugh KB4ZGC, *73* issue #368 May 1991 pp 11 - 12, 18. il cct, cmp, pcb and photos. This device is capable of measuring inductance values for 1 to 30μH. A 5MHz crystal oscillator ensures bridge stability. The measurement range may be altered by different choice of crystal frequency or tuning capacitor.

Using a Noise Bridge To Measure Co-

axial-cable Impedance. Jack Althouse K6NY, *QST* (Technical Correspondence) vol LXXV No 5 May 1991 p 45. il diag. A technique is described to use a noise bridge to measure the characteristic impedance of coaxial cable.

CROs

New CRO Adaptor for Monitors - 2. Peter Phillips, *EA* vol 52 No 5 May 1991 pp 74 - 80. il ccts, cmp, diags, pcb and photos. Construction details are given for input amplifier and graticule generator.

New CRO Adaptor for Monitors - 3. Peter Phillips, *EA* vol 52 No 6 June 1991 pp 72 - 78. il ccts, cmp, diag, pcb and photos. Concluding part provides details of A to D conversion and storage circuits. The complete construction and adjustment is discussed in detail.

Miscellaneous

A Better Tube Tester. John Shelley WA1IAO, *73* issue #368 May 1991 pp 30, 32. il cct, diag and photo. Device tests for interelectrode shorts by means of manual switching between base pins. 7 and 9 pin bases are catered for on a plug-in basis; others may be tested by flying leads.

Transceivers

Miscellaneous

A Digital Frequency Display for the Modular Transceiver. Mike Grierson G3TSO, *RadCom* vol 64 No 4 April 1991 pp 49 - 51, 54. il ccts, cmp, graphs and pcb. A design for a four digit frequency display, with a resolution of 100 Hz. The ability of the Intersil 7217 IC to be offset programmed is exploited so that the display only requires local oscillator input to present operating frequency.

Covert Hamming. Eldon Ryan K6BRP, *73* issue #368 May 1991 pp 20, 85. il ccts and photos. A design for a miniature microphone and PTT switch, which enables a hand held to be used in a clandestine manner. The microphone may be concealed in a pen housing, or within a phone jack plug.

Product Reviews

Kenwood TS-790A VHF/UHF Transceiver. James W (Russ) Healy NJ2L, *QST* vol LXXV No 4 April 1991 pp 39 - 43. il photos. A comprehensive review, with measurements and spectral responses for this transceiver.

Transmitters

QRP

Two QRP Transmitters. Charles D Rakes KI5AZ, *73* issue #368 May 1991 pp 26, 28 - 29. il ccts, cmps, pcbs and photos. (1)'Color Burst Ether Duster' (so named from the use of a 3.579 MHz colo(u)r burst crystal) is designed to produce 1W output via four 2N3904 transistors in parallel.

Two 7400 quad gates supply oscillation and drive for the transistors. (2) The '40m Wave Bender' gives 500 - 750 mW output from a pair of 2N3904 transistors. driven and controlled by a single 7400 quad gate.

Glossary of Abbreviations

il	The article contains illustrations, a list of which follows.
cct	A circuit diagram
cmp	A component layout drawing
EA	*Electronics Australia*
diag	A mechanical drawing
pcb	A master drawing from which printed circuits may be produced
QSTVE	*QST Canada*
RadCom	*Radio Communication*
73	*73 Amateur Radio Today*

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OVER TO YOU

ALL LETTERS FROM MEMBERS WILL BE CONSIDERED FOR PUBLICATION BUT MUST BE LESS THAN 300 WORDS. THE WIA ACCEPTS NO RESPONSIBILITY FOR OPINIONS EXPRESSED BY CORRESPONDENTS.

Slow Sleuths

Regarding recent letters to *AR* about unlicensed operators and pirates, I had an instance in January 1991 where a pirate was heard operating on 28.485MHz using a callsign which is allocated to a VK5 club station.

After gathering, with the assistance of a full-call operator, as much information as possible, letters were written to the WIA SA Division, DoTC and the club station concerned.

I received a verbal thank-you from the WIA SA Division, but the club station and DoTC did not even bother to acknowledge my letters. If DoTC cannot be bothered to acknowledge correspondence in regard to unlicensed operators or pirates, I ask you, what hope do we have?

I suppose if we lose the 10m band that will be one band less for DoTC to worry about, that is if it worries about the bands in the first place.

BILL VOGEL VK5NVW
16 WANDILLA ST
LARGS NORTH 5016

Plug Availability etc

Re the common three-pin plug that is used on all household domestic appliances, and possibly misused elsewhere. A while back I saw a motor vehicle parked in front of the local hospital with a short length of three-core flex and a three-pin plug hanging out from under the engine bonnet.

Now, to get to my point. Just where can one get plugs and sockets like the old Jones plugs and sockets along with other types that can be used safely where there is a bit of current or voltage or both? It seems that all one can get today are "D" connectors, microphone connectors and printed-circuit-board plugs and connectors. In regard to the use of the 10m band (amateur) by non-amateurs (Over To YOU, June 1991) maybe we have here a case for dropping the CW requirement for all frequencies higher than 25MHz.

This would allow those with limited licences to use this band and perhaps encourage these people to upgrade their licences because of the creation of an interest in the high frequency bands.

A case of populate or perish.

GRAHAM J MUIRHEAD VK4WEM/4WIW
23 CUNNINGHAM ST
WARWICK 4370

Amateur and CB Combined?

I have been reading and hearing of the concerns of amateurs regarding potential loss of 28MHz. I have also heard suggestions of no-code amateur licences being introduced overseas. It seems that there is a trend for amateur radio options to expand to fill the gap after CB. I have often thought that it is silly that I must have TWO receivers if I wish to listen to 28MHz sometimes, and talk with the CBers other times. I like the use of CB when on the road, and it is the only legal way I can transmit below 30MHz, having only a limited amateur licence as well as CB.

If DoTC allowed amateurs to transmit on 27MHz, provided they kept to AM/SSB and around four watts, then they could retain and maintain ONE rig. They could encourage the progress, on-air, of those serious technically minded parties who are restricted to CB. Provided amateurs using CB didn't abuse the options (eg, by holding Morse QSOs) I believe this could do more good than harm.

IAN GRIFFITH VK3XNV
PO BOX 323
ROSANNA 3084

Displays, Museums, Collections

From time to time one reads of a certain display, museum or collection featuring amateur radio or related equipment. Possibly most are the work of various organisations or groups, but it is obvious from advertisements that a number of individuals have collections or are restoring old equipment.

I have not seen this information in a correlated form, and think that such a list would be in the interest of all concerned. The list could include such information as type and size of

exhibit, organiser, location, viewing times etc. I would assume that many of the smaller collectors are happy to welcome interested viewers and that it may be necessary to arrange a suitable time. The list could, in this case, give a contact phone number.

Should there be a reasonable response to this idea, a suitable list could be prepared, kept up to date, and published in *AR* a suitable number of times per year.

RON GRAHAM VK4BRG
BOX 323
SARINA 4737.

W6 Visiting Cairns

The following amateur is visiting the Cairns area from 25 September to 5 October and would like to meet or stay with locals, particularly anyone offering paid bed and breakfast service. He can afford to stay at the tourist traps but would prefer to taste Aussie hospitality. He is also looking for ideas as to how to make the most of his short stay. Monty has looked after many visitors at his Los Angeles home through the International Travel Host Exchange scheme and would be pleased to hear from intending visitors, even if they are not ITHE participants. Contact:

Monty Bancroft W6NJW
9921 Edmore Place
Sun Valley CA 91352 USA
Tel: 0011 1 818 767-3499

If you wish to be placed on the ITHE list (free service offered by the WIA), please contact me at the address below. Please advise your callsign/s, phone numbers, languages spoken and whether you want to accommodate visitors or just meet them.

ASH NALLAWALLA VK3CIT/ZL4LM
FEDERAL CO-ORDINATOR, ITHE AUSTRALIA
PO BOX 539
WERRIBEE 3030.

CB and Amateur Radio

I read with interest both the editorial and the letter from Neil VK6NE in the June issue. The Sydney Radio Group is basically tackling the situation in reverse order. We started out as a CB group only, about eight years ago. Now we have about 18 amateurs in the group - six full call, one combined, and the rest limited. All are still very active on the CB band, keeping in touch with the rest of the group with a regularly weekly get-together on 27MHz.

The group has run both NAOCP and AOCP theory courses for members, using the video tapes from Gladesville Amateur Radio Club. We propose running a "CB Workshop" covering such subjects as power supplies, antenna theory, propagation and operating protocol. We hope it will generate pride in operating a good station and develop an interest in upgrading to the amateur bands. We have just completed a (wet) weekend operating under canvas in the Blue Mountains where unlicensed operators were given some hands-on experience talking on the amateur bands (club call is VK2SRG). We also publish a quarterly newsletter to keep members in contact with group activities.

Perhaps some of the "amateur only" clubs need to hold an "open day" every two or three months where interested CBers can come in and see and use an operating amateur station. Maybe even offered associate membership for a nominal amount. Encouragement, example, exposure, enlistment. Show them the way to expand their horizons and you may increase club membership and the amateur ranks.

JIM STEDMAN VK2XJX
SYDNEY RADIO GROUP
PO BOX 185
GORDON 2072

Radio Theme Variations

The June editorial comment on amateur radio is a simple and precise statement of fact. Radio has "come of age" and is no longer a heady adventure. A solar outburst will perhaps provide conditions for the "specialists" to achieve a new VHF or UHF record.

All technologies mature, and radio has, in the past 20 years, become an acceptable norm - colour TV from the moon, IDD to anywhere, metal and fibre-optic cables plus satellites have linked together the world via telex, telephone, TV and now fax. The cellular phone system has destroyed privacy in developed areas, and CB extends the range of the shout over the fence with a useful anonymity!

What is left is the opportunity to pursue development, not necessarily in the straight line laboratory or commercial sense, but for the pleasure of exploring POSSIBILITIES, likely or unlikely, and re-examination of "past" techniques. Did they have virtues that were not perceived or achievable with available components? There are still frontiers in communication. Make up your own list of the aspects of operation and performance of equipment that you feel needs improving, and hang it on the wall with the QSLs. Solve one and add it to your awards list!

My original licence was headed Experimental Radio Licence - passive operation of a black box, no matter how complicated, can never equal full personal involvement with its sense of achievement. Cut and try a new antenna, dig in an earth plate and really get out on 160; use the excellent articles in *AR* and have a first-class mobile; oh, and check out the antenna system.

A club field day with a field strength meter for comparisons can be instructive.

You have the privilege to investigate every aspect of the frequencies allocated and the equipment you can acquire or devise to utilise them. A multitude will co-operate in the testing process. Maybe our executive should be more active in this "mode"?

ROBERT R MCGREGOR VK3XZ
2 WILTSHIRE DRIVE
SOMERVILLE 3912

Long Live CW

I thought it was time to put pen to paper and write my thoughts on a debate that became extremely heated on a 2m repeater recently.

Yes, it's on again - the CW debate. Well, first of all, I am a full call. I got this at 25 years of age. I, like so many others, found the task hard and sometimes annoying (along with all the other excuses you hear), but the success of a pass at 10 words per minute brought satisfaction. It was something new. Yes, it may be old in its history, but new to the individual. This brings me to my argument. Yes, I found it hard, but it is part of the whole hobby I am interested in. There are lots of directions to take - ATV, digital, satellite and many others. But, where did it all start? Well, it started with those "home brewers" who built the CW transmitters that conquered the world on QRP. There would be no amateur radio, if not for these people.

Nobody is asking it to stand still (God forgive! Long live progress), but it is part of our hobby. Now, for those lazy people who believe it is their God-given right to just show up anywhere at 400 watts, just because they have some *theory* technical ability, you are joking!

Let's continue the CW, sort out the men from the boys, and see who is genuine interested in the hobby, which means its future and, most of all, its colourful past.

LONG LIVE CW.
GEOFF MARSH VK2GRM
10 LANDAIS PLACE
EMU PLAINS 2750

Morse Transmissions

I feel Slow Morse listeners in VK4 deserve some explanations as to why the timetable as published in *AR* and the Call Book has not been accurate for the past year. Apologies to all those who tried unsuccessfully to extract information.

It all started with a letter sent by TARC, but not by me, in July last year, and in spite of regular updates and corrections being forwarded for publication, the contents of this ill-fated letter are still appearing in *AR*.

Apologies to Mount Isa VK4WII was a misprint for Brisbane VK4WIL. Apologies to Sunshine Coast - your enthusiastic efforts on 3542kHz were good listening, but not part of the official timetable.

For those who really want to know, the present timetable is:

Monday	Townsville Amateur Radio Club	VK4WIT
Wednesday	Townsville Amateur Radio Club	VK4WCH
Thursday	Gladstone area	VK4AV
Sunday	Sunshine Coast Amateur Radio Club	VK4WIS

Time: 0930 UTC (some stations go to 0830 during summer time)
Frequency 3535kHz

Clubs, groups or individual operators interested in sending Slow Morse sessions on Tuesday, Friday or Saturday nights contact the

Slow Morse Co-ordinator via TARC, PO Box 964, GPO Townsville 4810, or call back on one of the sessions.

SALLY GRATTIDGE VK4MDG
SLOW MORSE CO-ORDINATOR (QUEENSLAND)
ar

Innovation?

I refer to your issue of April 1989, page 64, in which reference was made to the resignation of Fred Swainston from the position of VK3 Divisional Education Officer. The statement was made that "Fred innovatively pioneered revision weekends" - presumably in the lead-up to DoTC examinations.

I must point out that the WIA NSW Education Service and Youth Radio Scheme had conducted Study Weekends years ago. Camp Technology was organised, using accommodation at Mount Victoria year after year. Also, at Katoomba we used a Catholic seminary to accommodate quite popular study sessions just prior to DoTC testings. There are many present-day amateur operators who benefited by these seminars.

With all due respect to Fred, whose reference book is of great benefit to amateur radio students, I feel that the "innovatively" designation is not quite appropriate.

REX BLACK VK2YA
562 KOORINGAL RD
WAGGA WAGGA 2650 ar

Handybridge Impedance Bridge for HF

(Continued From page 9)

cannot get yours to work satisfactorily, please write to me about it and any reasonable amount of help will be returned (SASE, please).

Parts

All the components should be available from the usual electronics suppliers. The 100 + 200pf variable capacitor and all other parts were obtained from Truscotts Electronic World ([03] 723 3860 - will answer mail orders). Suppliers of Amidon cores also regularly advertise in this journal.

References and Further Reading

1. *Radio Handbook* - Orr
2. *Solid State Design* - Hayward & DeMaw
3. A Simple Impedance Bridge Diamond VK3XU, *AR* May '89
4. Measuring Small Coils and Capacitors - Novite Notes *AR* May '88
5. Any recent *ARRL Handbook*.

Parts List

Capacitors

3.3pF NPO ceramic	C5, C7
27pF (nominal) NPO ceramic	C3
100pF (nominal) styroseal	C2
220pF (nominal) styroseal	C1
100 + 200pF air variable	C4
0.01µF ceramic	C11
0.047 (or 0.1) vF or monolithic	C6, C8, C9, C10.

Resistors

100ohm 1/2W 5%	R2, R6, R8 (2)
1k linear (A) pot with long 1/4" shaft	R7
47kohm 1/2W 5%	R1
100kohm 1/2W 5%	R4, R5
220kohm 1/2W 5%	R3.

Semiconductors

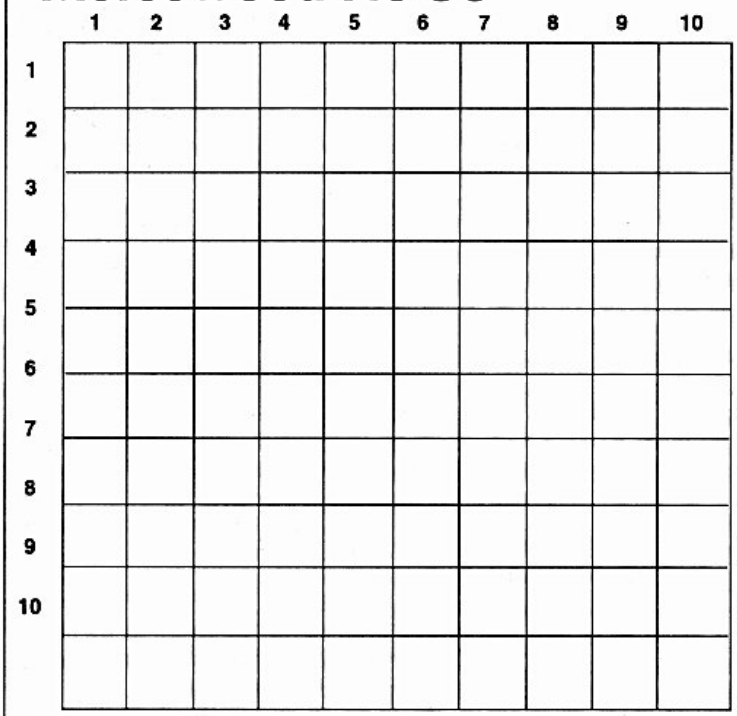
MPF102, 2N5457 etc	Q1
MFE131, 40673 etc	Q2
1N914, 1N4148	D1
Germanium diode, OA91, OA95	D2.

Miscellaneous

Case to suit, Amidon T68-1, T68-2 (2), T68-6, FT50-43, FB43-101 bead, #22 and #24 enamel wire, 4 or 5-pin line plugs (4), line socket, coax socket, 6.5mm knitting needles (4), on/off switch, tag strips (3), knobs, reduction drive (Dick Smiths), flexible coupler, perspex for cursor and battery holder, 9V type 216 battery and connector, 250mA meter, hook-up wire, screws, nuts, epoxy glue etc. ar

Solution Page 56

Morsewood No 53



Across
1 Sense
2 Carry
3 Church house
4 Prevalent
5 Sins
6 Ode
7 Marries
8 Skin
9 Taste, for one
10 Boast

Down
Tarts
2 Picture
3 Look intently
4 Hand
5 Pretent
6 Tier
7 Chooks
8 Post
9 You have, thou ..
10 Note of the scale

Audrey Ryan © 1991

HF PREDICTIONS

Roger Harrison VK2ZTB
The Apogee Group

This month, two DXpeditions are scheduled: one to Myanmar, previously known as Burma, and one to Annobon Island, which is in the Gulf of Africa, south of Nigeria and west of Gabon. For Myanmar, the Asian predictions should serve. For the Annobon Island DXpedition (3C0), I have produced the three 14 MHz signal strength versus time (UTC) graphs, shown in Figure 1 here, assuming 400 watts transmit power, all other parameters being as usual.

The Tables Explained

The tables provide estimates of signal strength for each hour of the UTC day for the five bands from 14 to 28 MHz. The UTC hour is the first column, the second column lists the predicted MUF, the third column the signal strength in dB relative to 1 µV (dBU) at the MUF. The fourth column lists the "frequency of optimum travail" (FOT), or the optimum working frequency.

The signal strengths are all shown in dB relative to a reference of 1 µV in 50 Ohms at the receiver antenna input. The table below relates these figures to the amateur S-point 'standard' where S9 is 50 µV at the receiver's input and the S-meter scale is 6 dB/S-point.

µV in 50 Ohms	S-points	dBU
50.00	S9	34
25.00	S8	28
12.50	S7	22
6.25	S6	16
3.12	S5	10
1.56	S4	4
0.78	S3	-2
0.39	S2	-8
0.2	S1	-14

The tables are generated by the Graph-DX program, assuming 100 W transmit power output, modest beam antennas (e.g. three-element Yagi or cubical quad) and a short-term forecast of the sunspot number. Actual solar and geomagnetic activity will affect results observed.

The three regions cover stations within the following areas:

VK EAST. The major part of NSW and Queensland.

VK SOUTH. Southern-NSW, VK3, VK5 and VK7.

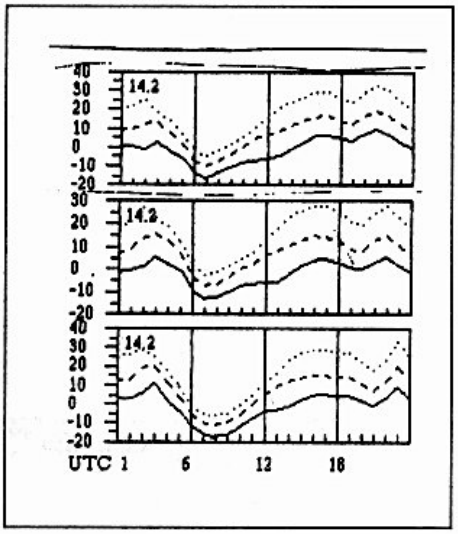


Figure 1. 14 MHz signal strength predictions for the Annobon Island DXpedition. Top chart: VK East, then VK South, with VK West at the bottom. Solid line 90% of days, dashed line 50% of days, dotted line 10% of days. UTC time, 1 to 24 hours, left to right.

VK WEST. The south-west of West Australia.

ar

VK EAST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.4	5	13.2	-1	5	4	-1	-9
2	17.3	-1	13.0	-10	0	1	-2	-9
3	20.8	0	15.5	-21	-4	0	1	-2
4	26.0	3	19.7	-34	-9	-1	3	2
5	27.6	2	20.8	-37	-12	-3	1	1
6	27.0	1	20.4	-38	-12	-3	1	1
7	25.9	1	19.6	-35	-11	-3	1	0
8	24.3	1	18.4	-27	-7	0	1	0
9	22.3	1	16.8	-19	-3	1	1	-2
10	20.0	2	15.1	-10	1	2	0	-6
11	18.0	4	13.6	-2	4	3	-3	-12
12	16.2	7	12.2	5	6	1	-8	-20
13	14.9	11	11.2	11	7	-1	-13	-29
14	14.0	16	10.4	16	7	-4	-20	-39
15	13.3	22	10.1	20	6	-7	-27	...
16	12.7	25	9.5	21	4	-11	-33	...
17	12.4	27	9.4	21	3	-14	-37	...
18	11.4	29	8.7	17	-3	-22	...	...
19	10.4	30	7.9	12	-11	-33	...	...
20	11.0	30	8.5	15	-6	-27	...	...
21	14.5	27	10.8	28	13	0	-19	...
22	19.5	22	15.0	32	25	17	7	-5
23	18.0	20	13.8	23	20	14	4	-7
24	19.7	14	15.0	12	15	12	6	-2

VK STH - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	17.5	10	13.3	7	10	7	0	-10
2	17.3	2	13.0	-4	3	2	-2	-10
3	20.9	2	16.4	-16	-1	2	1	-2
4	26.2	3	19.9	-29	-7	0	3	2
5	27.0	2	20.2	-34	-10	-2	2	1
6	26.7	1	20.0	-35	-11	-3	1	0
7	26.0	1	19.5	-34	-11	-2	0	0
8	24.7	1	18.5	-29	-8	-1	1	-1
9	22.8	1	17.1	-22	-4	0	0	-2
10	20.7	1	15.5	-13	0	2	0	-6
11	18.0	2	13.5	-5	2	1	-4	-13
12	15.8	5	11.8	3	4	-1	-10	-23
13	13.9	8	10.3	8	3	-6	-20	-38
14	12.5	13	9.2	11	0	-13	-33	...
15	11.6	21	8.6	13	-4	-21	...	...
16	11.3	25	8.3	14	-6	-26	...	...
17	10.9	27	8.1	13	-9	-30	...	...
18	10.8	28	8.1	13	-10	-32	...	...
19	10.1	29	7.7	9	-16	...	...	...
20	9.6	30	7.3	5	-22	...	...	...
21	10.3	29	7.9	10	-14	-38	...	...
22	13.2	27	10.3	23	6	-10	-33	...
23	15.8	23	12.2	26	17	7	-6	-22
24	20.1	18	15.2	21	20	16	8	-1

VK WEST - MEDITERRANEAN

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	16.1	16	12.2	17	12	5	-7	-21
2	15.9	7	12.0	5	6	1	-8	-20
3	19.2	4	15.1	-5	4	4	0	-7
4	23.9	4	18.2	-16	0	4	4	1
5	25.2	2	19.5	-22	-4	1	2	0
6	24.8	1	18.7	-26	-6	0	1	-1
7	24.6	1	18.6	-27	-7	-1	0	-1
8	24.2	0	18.3	-25	-6	0	0	-2
9	23.2	1	17.6	-22	-4	0	0	-3
10	21.8	1	16.5	-15	-1	1	0	-5
11	20.1	3	15.1	-6	2	3	-1	-9
12	18.0	6	13.6	3	6	2	-5	-16
13	16.3	9	12.3	10	7	0	-11	-25
14	14.7	14	11.1	14	6	-4	-20	-39
15	13.6	20	10.2	18	4	-10	-31	...
16	12.8	23	9.6	18	1	-16	...	...
17	12.2	25	9.3	17	-2	-21	...	...
18	11.6	27	8.7	15	-6	-27	...	...
19	11.3	28	8.6	14	-9	-30	...	...
20	10.4	28	7.9	9	-17	...	...	...
21	9.5	29	7.3	2	-27	...	...	...
22	10.0	29	7.7	6	-22	...	...	...
23	13.1	26	9.8	22	3	-14	-38	...
24	16.6	24	12.7	29	19	10	-4	-19

VK EAST - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	16.2	8	11.0	7	8	4	-3	-13
2	15.6	11	10.7	11	10	4	-4	-16
3	15.0	15	10.3	15	11	4	-7	-20
4	14.2	17	9.8	17	10	2	-11	-26
5	14.2	21	9.9	21	13	3	-11	-28
6	14.8	22	10.3	23	15	5	-8	-24
7	17.1	22	12.0	26	20	12	1	-11
8	17.6	15	13.7	19	15	8	-2	-14
9	15.4	10	11.9	10	7	1	-9	-23
10	13.5	2	10.4	3	2	-4	-15	-29
11	12.1	-9	9.2	-2	-1	-6	-17	-30
12	11.2	-17	8.5	-4	-2	-6	-16	-29
13	10.8	-37	8.4	-16	-11	-15	-24	-38
14	10.4	...	7.9	-30	-23	-26	-37	...
15	10.1	...	7.8	...	-32	-35	...	...
16	9.5	...	7.3	...	...	...	...	...
17	9.0	...	7.0	...	...	...	...	...
18	9.7	...	7.6	...	...	...	...	...
19	12.3	...	9.2	-27	-15	-15	-21	-31
20	16.3	-10	13.0	-19	-6	-3	-5	-11
21	20.4	-2	14.2	-22	-5	-1	-1	-5
22	19.0	0	13.1	-14	-1	1	0	-4
23	18.0	3	12.4	-5	3	3	0	-6
24	17.2	6	11.7	1	6	4	-1	-9

VK STH - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.5	5	10.8	3	5	2	-6	-16
2	15.0	8	10.4	8	7	1	-8	-20
3	14.3	12	10.0	12	8	0	-11	-26
4	13.6	16	9.6	15	8	-1	-16	-33
5	13.7	21	9.7	20	10	-1	-17	-34
6	14.2	21	10.1	22	12	1	-13	-30
7	16.2	20	11.6	23	16	8	-3	-17
8	17.3	16	13.5	19	14	7	-3	-16
9	15.0	11	11.7	11	7	0	-12	-27
10	13.3	3	10.3	4	1	-6	-18	-34
11	11.9	-5	9.1	0	-2	-9	-21	-37
12	11.1	-13	8.5	-2	-3	-9	-20	-34
13	10.7	-29	8.4	-11	-8	-14	-25	-39
14	10.3	...	7.9	-27	-22	-27	-39	...
15	10.0	...	7.7	...	-35	-39	...	...
16	9.3	...	7.2	...	...	...	...	...
17	9.0	...	7.0	...	...	...	...	...
18	9.6	...	7.6	...	...	...	...	...
19	11.8	...	8.9	...	-28	-28	-34	...
20	15.3	-15	12.2	-20	-7	-4	-6	-12
21	19.0	-6	14.0	-26	-8	-4	-3	-7
22	18.4	-5	12.9	-22	-6	-2	-2	-6
23	17.4	-3	12.1	-14	-2	0	-2	-8
24	16.5	1	11.5	-5	2	1	-3	-11

VK WEST - EUROPE L.P.

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	15.1	-6	10.5	-8	-2	-3	-9	-17
2	14.5	-2	10.2	-3	0	-3	-11	-21
3	13.9	1	9.8	1	1	-4	-13	-26
4	13.2	3	9.4	4	1	-5	-17	-31
5	13.3	7	9.5	7	3	-5	-18	-33
6	13.8	9	10.0	9	4	-3	-15	-30
7	15.7	12	11.4	12	9	2	-7	-20
8	18.1	13	13.1	14	13	9	0	-9
9	19.4	10	14.6	11	11	7	0	-9
10	17.0	8	13.2	5	5	1	-7	-18
11	14.8	0	11.4	-1	0	-4	-15	-25
12	13.1	-8	10.0	-5	-3	-7	-16	-28
13	11.7	-18	8.9	-7	-4	-8	-17	-29
14	10.9	...	8.3	-20	-15	-18	-28	...
15	10.5	...	8.2	-56	-28	-31	...	...
16	10.1	...	7.7	...	...	...	...	...
17	9.8	...	7.5	...	...	...	...	...
18	9.2	...	7.1	...	...	...	...	...
19	8.8	...	6.9	...	...	...	...	...
20	9.5	...	7.5	...	...	...	...	...
21	11.6	...	8.7	-58	-25	-26	-33	...
22	15.1	-16	12.1	-20	-8	-6	-9	-15
23	16.9	-11	11.9	-22	-8	-5	-6	-11
24	16.0	-8	11.2	-15	-5	-3	-7	-13

APOGEE ARTS

VK EAST - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.2	6	8.9	5	-5	-19	-39	...
2	10.7	0	8.2	3	-5	-16	-34	...
3	10.9	-7	8.4	0	-4	-14	-29	...
4	14.6	-2	11.4	-3	0	-3	-12	-24
5	20.6	3	15.9	-9	1	3	0	-6
6	23.6	3	17.6	-12	0	3	2	-2
7	22.5	2	16.8	-12	0	3	1	-4
8	20.8	3	15.5	-8	2	3	-1	-7
9	18.9	3	14.1	-3	3	2	-3	-12
10	16.5	3	12.3	0	3	0	-9	-20
11	14.4	4	10.7	4	2	-5	-17	-32
12	12.7	5	9.4	6	0	-10	-26	...
13	11.4	10	8.4	7	-4	-18	-39	...
14	10.7	16	7.8	8	-8	-25	...	...
15	10.3	24	7.7	10	-11	-31	...	...
16	9.9	27	7.3	9	-14	-36	...	...
17	9.6	29	7.2	8	-17	...	...	...
18	9.0	31	6.8	4	-23	...	...	...
19	8.6	32	6.6	2	-27	...	...	...
20	9.3	31	7.1	6	-21	...	...	...
21	9.5	31	7.3	7	-19	...	...	...
22	8.9	27	6.9	3	-24	...	...	...
23	8.6	16	6.7	0	-24	...	...	...
24	9.2	9	7.3	1	-17	-36	...	...

VK STH - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	11.0	13	8.4	9	-3	-18	...	...
2	11.3	7	8.7	7	-3	-15	-34	...
3	15.2	8	11.3	8	6	0	-11	-25
4	21.4	9	16.5	4	10	9	4	-3
5	24.5	6	19.8	-4	6	8	6	0
6	25.8	5	20.8	-7	4	7	6	2
7	25.3	5	20.2	-8	4	7	5	1
8	24.0	5	19.1	-5	5	7	4	0
9	22.2	6	17.6	-1	6	7	3	-3
10	20.2	7	15.9	3	8	6	0	-8
11	17.8	8	13.9	6	7	3	-5	-17
12	15.3	9	11.9	10	6	-1	-14	-29
13	13.6	13	10.5	12	3	-7	-24	...
14	12.2	19	9.3	14	0	-16	-37	...
15	11.5	24	8.8	15	-3	-21	...	...
16	11.0	27	8.4	14	-6	-26	...	...
17	10.6	29	8.1	13	-9	-31	...	...
18	10.2	30	7.8	11	-13	-36	...	...
19	9.5	31	7.4	7	-19	...	...	...
20	9.4	31	7.3	6	-21	...	...	...
21	10.0	30	7.9	10	-14	-38	...	...
22	9.8	31	7.4	8	-18	...	...	...
23	9.3	26	7.2	5	-20	...	...	...
24	9.9	18	7.8	6	-13	-33	...	...

VK WEST - AFRICA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	9.9	19	7.6	7	-13	-33	...	...
2	11.3	12	8.7	9	-2	-17	-37	...
3	15.2	11	11.4	11	7	0	-12	-27
4	21.5	9	16.7	6	11	9	4	-3
5	25.1	6	19.1	-1	8	9	7	1
6	25.2	5	18.9	-6	5	7	5	0
7	24.9	4	18.6	-8	4	6	4	0
8	24.2	4	18.1	-8	3	6	4	-1
9	23.0	4	17.3	-6	4	5	2	-3
10	21.3	6	16.0	0	7	6	1	-6
11	19.3	8	14.4	5	8	5	-2	-12
12	16.8	10	12.6	10	8	2	-9	-22
13	14.7	13	11.0	14	6	-3	-18	-36
14	13.0	18	9.6	16	3	-11	-31	...
15	11.7	24	8.6	16	-2	-20	...	...
16	10.9	27	8.0	14	-7	-28	...	...
17	10.5	29	7.9	13	-10	-32	...	...
18	10.2	31	7.6	11	-13	-36	...	...
19	10.0	31	7.5	11	-14	-38	...	...
20	9.4	32	7.1	7	-20	...	...	...
21	8.9	33	6.8	4	-25	...	...	...
22	9.6	32	7.4	8	-18	...	...	...
23	9.9	32	7.5	10	-14	-39	...	...
24	9.2	29	7.0	6	-20	...	...	...

VK EAST - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	20.4	17	17.3	20	20	15	6	-5
2	20.1	17	17.2	21	20	15	5	-6
3	19.9	17	16.0	22	20	15	5	-7
4	19.4	19	14.7	24	21	15	4	-9
5	18.6	21	14.1	28	22	14	1	-13
6	17.4	25	13.1	33	23	12	-3	-20
7	15.9	28	12.0	34	20	7	-11	-31
8	14.1	31	10.7	30	13	-2	-24	...
9	12.7	33	9.6	26	6	-12	-37	...
10	11.4	35	8.5	21	-3	-24	...	...
11	10.4	36	7.8	15	-11	-36	...	...
12	9.7	37	7.3	11	-18	...	...	...
13	9.3	38	7.0	7	-23	...	...	...
14	8.9	38	6.7	4	-28	...	...	...
15	8.7	39	6.6	2	-30	...	...	...
16	8.1	39	6.2	-3	...	...	...	...
17	7.4	40	5.7	-11	...	...	...	...
18	7.8	40	6.1	-6	...	...	...	...
19	10.2	33	7.6	13	-12	-37	...	...
20	13.9	24	10.8	23	10	-4	-24	...
21	17.3	20	13.4	24	18	9	-4	-19
22	19.5	18	15.0	23	21	14	4	-8
23	20.3	17	15.9	22	21	15	6	-5
24	20.6	17	16.9	21	20	16	7	-4

VK STH - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	22.4	11	16.9	16	17	13	6	-4
2	22.3	11	16.7	16	17	13	6	-4
3	22.1	12	16.6	18	18	14	5	-5
4	21.9	13	16.4	21	19	14	5	-5
5	21.2	15	16.0	25	21	15	5	-7
6	19.8	19	14.9	32	24	15	5	-13
7	18.1	22	13.6	34	22	10	-5	-23
8	16.0	24	12.1	31	16	2	-17	-39
9	14.4	26	10.8	27	9	-7	-31	...
10	12.8	29	9.6	22	0	-19	...	...
11	11.5	30	8.6	16	-9	-34	...	...
12	10.4	31	7.7	9	-21	...	...	...
13	9.7	32	7.2	3	-29	...	...	...
14	9.4	33	6.9	1	-33	...	...	...
15	9.1	33	6.7	-2	-38	...	...	...
16	8.9	34	6.7	-3	...	...	...	...
17	8.3	35	6.3	-9	...	...	...	...
18	7.9	35	6.0	-15	...	...	...	...
19	8.5	29	6.5	-8	...	...	...	...
20	10.8	19	8.4	7	-15	-37	...	...
21	14.4	15	11.1	15	4	-8	-28	...
22	18.0	13	13.8	17	13	5	-7	-23
23	20.6	12	15.7	17	16	11	1	-10
24	21.9	11	16.6	16	17	13	4	-6

VK WEST - ASIA

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	26.6	8	20.2	4	12	13	10	5
2	27.3	8	20.5	3	12	13	11	6
3	27.1	8	20.5	4	13	14	11	6
4	26.8	9	20.1	7	14	15	11	6
5	26.3	10	19.7	12	17	17	12	6
6	25.1	13	18.8	21	22	19	13	5
7	23.3	16	17.5	29	26	21	12	2
8	21.1	20	15.9	34	27	19	8	-4
9	18.5	23	13.9	34	24	14	0	-15
10	16.4	25	12.3	32	20	8	-9	-27
11	14.5	28	10.8	29	14	0	-20	...
12	13.1	30	9.7	26	8	-8	-31	...
13	12.2	31	9.0	23	3	-15	...	...
14	11.5	32	8.5	20	-1	-21	...	...
15	11.2	32	8.4	18	-4	-25	...	...
16	10.8	33	8.0	17	-6	-28	...	...
17	10.5	33	7.9	15	-8	-30	...	...
18	9.7	34	7.4	11	-14	-39	...	...
19	9.5	30	7.2	8	-17	...	...	...
20	10.2	20	7.8	9	-11	-31	...	...
21	13.2	15	9.7	13	3	-9	-28	...
22	17.7	12	13.6	13	11	5	-5	-18
23	22.1	10	17.0	9	13	11	5	-3
24	25.3	9	19.2	6	13	13	9	3

VK EAST - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	28.5	4	21.4	-26	-4	2	5	4
2	27.1	7	21.1	-13	2	7	8	6
3	25.4	11	20.4	0	10	13	12	8
4	24.1	15	19.3	14	18	18	14	8
5	23.5	19	18.7	27	26	23	17	9
6	23.0	22	18.2	36	31	26	18	10
7	22.1	22	17.5	37	31	24	15	5
8	21.0	22	15.9	37	29	21	10	-1
9	19.2	23	14.4	36	26	17	5	-9
10	17.5	24	13.1	34	23	12	-2	-18
11	16.2	25	12.1	32	19	7	-8	-26
12	15.2	26	11.3	29	16	3	-15	-35
13	14.2	25	10.6	25	11	-2	-21	...
14	13.4	19	10.0	18	6	-7	-25	...
15	12.8	12	9.7	11	2	-9	-26	...
16	11.7	0	8.9	3	-3	-13	-29	...
17	10.4	-13	8.0	-1	-6	-15	-31	...
18	10.9	-18	8.4	-4	-5	-12	-24	...
19	14.5	-10	11.2	-11	-3	-5	-11	-21
20	20.1	-2	15.5	-22	-5	-1	-2	-7
21	25.0	0	19.2	-32	-10	-2	0	-1
22	27.8	2	21.2	-37	-12	-2	1	1
23	28.5	2	21.7	-37	-11	-2	2	2
24	28.7	3	21.7	-33	-9	-1	3	3

VK STH - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	27.8	4	21.6	-24	-4	3	5	4
2	27.5	7	20.5	-10	4	8	9	6
3	26.8	10	20.3	2	12	14	12	8
4	25.6	14	19.8	16	20	19	15	9
5	25.0	16	18.9	27	26	23	17	9
6	23.4	19	17.5	34	29	24	15	5
7	21.2	21	15.8	35	28	21	10	-1
8	18.4	23	13.7	34	24	14	1	-13
9	16.2	25	12.0	31	18	6	-9	-28
10	14.2	27	10.5	27	11	-3	-23	...
11	12.7	28	9.4	22	4	-12	-36	...
12	11.8	29	8.7	19	-1	-20	...	...
13	11.4	26	8.5	15	-4	-23	...	...
14	11.1	18	8.2	10	-6	-23	...	...
15	10.9	8	8.2	6	-6	-20	...	...
16	10.2	-5	7.7	1	-7	-20	-39	...
17	9.6	-16	7.3	-1	-7	-18	-36	...
18	10.3	-19	7.9	-3	-5	-12	-26	...
19	13.4	-12	9.8	-9	-3	-6	-13	-25
20	18.2	-5	14.0	-19	-5	-2	-4	-10
21	22.8	0	17.5	-28	-8	-2	0	-3
22	26.1	1	19.9	-34	-10	-2	1	0
23	27.5	2	20.8	-35	-10	-2	2	2
24	28.1	3	21.1	-32	-8	0	3	3

VK WEST - STH PACIFIC

UTC	MUF	dBU	FOT	14.2	18.1	21.2	24.9	28.5
1	27.2	3	20.7	-36	-11	-1	3	3
2	26.3	5	20.8	-28	-6	2	5	5
3	24.5	8	19.6	-17	1	6	8	6
4	23.2	10	18.5	-5	7	10	10	6
5	22.4	14	17.8	7	14	15	12	6
6	21.9	18	17.3	18	21	19	14	7
7	20.9	22	16.9	28	26	22	14	6
8	20.1	26	15.7	35	30	23	14	4
9	18.9	27	14.6	37	29	21	11	-1
10	17.5	27	13.4	35	25	15	1	-13
11	15.7	28	11.8	32	20	8	-8	-27
12	13.8	29	10.3	28	13	-1	-21	...
13	12.4	28	9.3	22	6	-10	-32	...
14	11.6	21	8.6	15	1	-14	-37	...
15	11.3	12	8.5	10	-1	-14	-34	...
16	11.0	2	8.2	5	-2	-13	-30	...
17	10.9	-6	8.2	2	-2	-10	-25	...
18	10.3	-16	7.8	0	-2	-9	-23	...
19	9.6	-38	7.3	-9	-10	-17	-31	...
20	10.3	...	8.0	-16	-12	-17	-29	...
21	13.6	-16	10.0	-12	-2	-2	-7	-16
22	18.4	-6	14.2	-25	-7	-2	-2	-6
23	23.0	-1	17.6	-35	-11	-3	0	-1
24	26.1	1	19.9	-39	-13	-3	1	1

VK EAST - USA/CARIBBEAN

VK STH - USA/CARIBBEAN

VK WEST - USA/CARIBBEAN

APOGEE ARTS

SILENT KEYS

DUE TO INCREASING SPACE DEMANDS OBITUARIES MUST BE NO LONGER THAN 200 WORDS

Lea Downing VK4FX

Lea passed away on 20 June 1991 in the Bundaberg Base Hospital. He was 83 years old, and had moved from Gympie to Bundaberg many years ago. He was an active member of the local amateur radio club.

As a youth, Lea trained as a motor mechanic and, during the Second World War, he served with the Royal Australian Air Force as an aircraft engine maintenance fitter in New Guinea.

Prior to his retirement Lea conducted his own business of refrigeration service.

Lea had been interested in radio almost all of his life and held the call VK4FX since October 1963. Lea had been quite active on most bands.

His many interests include music and photography. For many years he was the official cine stringer photographer for the ABC in Bundaberg; in recent years he took an interest in video photography.

Lea will be sadly missed by the many friends and fellows amateurs who knew him.

Due to his influence and interest in amateur radio, his two daughters and two grandsons have callsigns: Ann VK4VAW, Kay VK4MQG, David VK4VOW, Michael VK4MLD.

To his two daughters, Ann and Kay, and their families, we extend our sympathy.

LES BRENNAN VK4XJ ar

We regret to announce the recent passing of:

Mr C Jeffery	VK2ACK
Mr J Trevena	VK2APT
Mr F L Barrett	VK2ECR
Mr T R Smith	VK3KQI
Mr R C Rivington	VK3NHI
Mr L Downing	VK4FX
Mr R Shartell	VK4ARS/VK3RS
Mr D A Ward	L40232
Mr T Reilly	VK5AI
Mr D Thornley	VK5NOD
Mr I Shearer	VK8IS

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● LOGMASTER: Radio logkeeping software $89. Codemaster: Morse training/proficiency software $49, endorsed by Officers of Signals Schools of Aust Army. Both products include manuals for IBM/clones PC, XT, AT. Information/order: Milestone Technologies P/L PO Box 699, Mt Waverley Vic Australia 3149. Tel (03) 807 6767. 8 Greenham Cres, Mt Waverley 3149.

● WEATHER FAX programs for IBM XT/ATs * Radfax2 is a high resolution shortwave weatherfax, morse & RTTY receiving program. Needs CGA, SSBhf radio & radfax decoder. Also RF2HERC, RF2EGA and RF2VGA, same as RADFAX2, but suitable for Hercules, EGA and VGA cards respectively, $35 * SATFAX is a NOAA, meteor and GMS weather satellite picture-receiving program, uses EGA or VGA modes. Needs EGA or VGA colour monitor and card, & WEATHER FAX PC card, & 137MHz receiver, $45 * All programs are on 5.25" or 3.5" disks (state which) & documentation, add $3 postage. ONLY from M Delahunty, 42 Villiers St, New Farm Qld 4005. Ph (07) 358 2785.

FOR SALE - NSW

● DECEASED ESTATE VK2ECR current Kenwood TS440S $1500. TS680S $1200. PS50 $350. FL2100B $700. FL2100Z $950. Mactronics Terminal RTTY etc $350. Sig Gen $250. BWD CRO 824 35MHz $400. Many other bits & pieces. Jack VK2APT QTHR (044) 76 7961.

● TANDY TRS80 computer, Model III twin drive with DMP106 Tandy printer and word processor software $450. VK2BZM David QTHR (02) 498 2259.

● DECEASED estate. Kenwood TS940S HF txvr $2500. Mike MC85 $50. Linear amp TL922 $1500. 2m txvr TM2570 $425. Icom hand-held IG2GAT $425. Tower with beam rotator controls $1950. 1kW dummy load $200. Other items available. (02) 580 5190.

● UNUSED Telereader CWR 685E. John VK2DEJ (02) 809 5686.

● MICROBEE 32K series 3 with word processor and Telecom 3 built in Mitsubishi high resolution amber monitor. Dot matrix printer 100cps. Tape drive with 93 programs, complete with back-ups. All manuals, magazines & original packing. All mint cond. $595. VK2MQ Brian (069) 47 1213 AH.

● YAESU 747GX S/N 9I200300 near new $1025. DSE multi-band receiver $80. Alinco DN-130MVZ power supply, s/no 9470004 $455. Bernard VK2FZH (02) 597 7427.

● YAESU FC707 ATU $250. Yaesu FT301D FP301D P/S FV301 ex VPO YO301 monitorscope $1400. Palomar TX100 HF linear $250. Webster Bandspanner mobile antenna 80-10m $150. VK2DB QTHR (063) 67 5095.

● AEA Pakrat 232 with AEA com Pakrat with fax for C-64. Includes RS232 interface for C64, as new cond. $500. Also Yaesu FT101Z digital fan, manual, original carton. Like new $625. Kirt VK2DOJ (02) 436 2618.

● KENWOOD TS130S $650. AT-180 $120. VK2AWA QTHR (066) 52 6135.

● DRAKE T4XC R4C transceiver L4B linear incl power supplies, manuals, all good working order $1500. Also Yaesu 757GX complete lineup $1800. Ian VK2CJP QTHR (02) 44 4985. SNS DRAKE 27743 5717 YAESU 4K131281 4K080406 4G070098 3L010089.

● KENWOOD TR851A 70cm all-mode txvr, unmodified, in carton, as new, $900 ONO. Terry VK2XAS (02) 724 9770.

FOR SALE - VIC

● YAESU FT101B SN:4G109924 in EC. Comp with manual, hand mike, AC/DC power cables, 4 spare final tubes and 2 spare drivers $670. FV101 matching VFO for FT101 SN:21408020. In EC, comp with manual $150. Yaesu desk mike to suit FT101, in EC $60. Philips FM828/25A Mk2 SN:68391 in VGC, tuned recently by Philips to 2m comp with mobile bracket, power cable and hand mike $170. David VK3THY QTHR (03) 646 1500 BH, (03) 434 7152.

● KENWOOD TM721A 2/70 Dual bander s/n 9081234 full duplex, CTCSS encode, multi scanning functions 45/35w O/P mob mount etc. Orig carton, EC, $890. Michael VK3EMJ QTHR (03) 531 9954.

● KEMTRONIC SSB 1000 180H 11m txvr. Microwave modules MMG 1296/144G transverter STC MTR 10-191D radiophone. Contact Roger VK3XRS (051) 56 8291.

● BATTERIES, Exide and Chloride lead acid cells $50 ea, and Power Sonic gell cells $100 ea. High current ratings, good cheap power supplies. Evan VK3EJV (03) 438 2878 AH.

● VALVES 572B one Cetron brand 80% efficient $95. One GE brand 50% efficient $30. Ferris standing wave bridge and field strength indicator model 30-100 $25. Four 2N250A transistors and mounting micas suitable for transistorised DC/DC converter $4. VK3EQO QTHR (03) 592 6236.

FOR SALE - QLD

● WORLD'S MOST WIDELY USED mobile radio, Kenwood TS440S in GC $1700. Also YK88SN SSB and YK88C CW filters $150 the pair. VK4CRR (074) 82 5272.

● CHIRNSIDE/TH6 6-element 3-band Yagi antenna, VGC. George VK4GB QTHR (07) 396 1836.

● KENWOOD TS520S with mike and manual in original carton, VGC $500. VK4ARB QTHR (07) 269 8848.

● ATU Emtronics 1.8 to 30MHz 300 watts $25. Linear amplifier (QQV03-20A) 433MHz, 10W in 40W out $60. 433MHz amp solid state 10W in 30W out $55. Spectrum analyzer, home brew $45. Video recorder (needs new heads) Beta-Sony $50. 50 to 54MHz transceiver, home brew, needs attention $50. VK4ZFQ. Not QTHR (077) 79 4641

● KENWOOD TS520S-3 spare finals digital display, R1000 full coverage receiver, TS440S transceiver with PS50 power supply, MC50 desk mike, Yaesu FL1000M linear amp, Werner Wulf triband Yagi antenna, complete with 90ft. RG8U coax. 40ft mast winch & guys. Icom-IC2A hand txvr-240V & adapter 12v adapter, extension aerial & speaker-mike, bat charger-4-NC batteries..Datong D70 morse tutor. George (070) 54 1043.

FOR SALE - SA

● KEN KP-202 2m FM handheld txvr crystals for 7 channels incl 4 repeaters, battery case, manual, exc working order. s/n PC13430 $100. VK5BVN QTHR (087) 24 9826 AH.

FOR SALE - WA

● GRID DIP Meter model TE15 0.44MHz-280MHz 6 coils plus old military crystal calibrator $120. VK6NAT (09) 384 8881.

WANTED - NSW

● YAESU Remote VFO FV-901-DM or FV-101-DM or FV102-DM, reasonable price offered for acceptable cond. Michael VK2BMV QTHR (02) 570 4642.

● 3EL TRIBAND BEAM TH3JR or similar. David VK2BZM QTHR (02) 498 2259.

WANTED - VIC

● KENWOOD TS-120S txvr, require copy of service manual and modifications. Will pay for costs and postage. David VK3THY QTHR (03) 434 7152 H, (03) 646 1500 W.

● VARICAP Diode BB122 suit DSE Commander VHF txvr VCO or info on available equivalent VK3XFO QTHR (03) 723 1694.

● 150W HF AM TX with modulator and PSU. Will collect. VK3BCV Jim (054) 60 4048.

● POWER SUPPLY 12v capable of 10 amps continuous contact. Steve VK3XSP QTHR.

WANTED - QLD

● SK800A TUBE base with faulty screen capacitor, also 4CX1000A or 4CX1500B tubes. Also heavy duty ceramic bandswitch for linear tank. John VK4TL (070 54 3677.

● COLLINS 32S2 receiver VK4CRO QTHR (07) 390 7762.

WANTED - SA

● TS820S power transformer 2m hand-held VK5NOT (088) 42 2913.

WANTED - WA

● YAESU FT200 parts, esp valves & any ext fittings for FM 2M 2/50ohms 100+W for d/load. VK6NST QTHR (09) 419 2951 any time.

● YAESU FT301 HELP needed. Measurements of RF levels at output of RF unit, noise blanker, filter and IF unit in CW mode at max drive. Gerry VK6GW QTHR.

● INTRUDER watch observers in VK6. Free tape, logs, postage and advice. Please help. Contact Graham VK6RO QTHR (09) 451 3561.

INTRUDER WATCH

GORDON LOVEDAY VK4KAL FEDERAL INTRUDER WATCH CO-ORDINATOR AVIEMORE RUBYVALE 4702

Summary for May 1991 Intruder Watch

Date	Time U/TC	Frequency in MHz 'M' or 'E'	Callsign if Heard	Mode	Hrs On	Logs X	Details of Traffic if known And Any Other Information
180591	1255	7000		J3E/U			Several stns on freq
130591	1242	7009.3		J3E			Multi ch Indon type language
210591	2139	7021	T30A	J3E			English (American) NOT amateur
1205	1237	7031		A1A			Alphanum grps (33W/4U/UN/DLO)
1305	1246	7083.5		F1B		2	Pop music & teleph conv
mni	mni	14007		F1B		4	AWMO 1000Hz continuous
mni	0610+	14023		F1B	24	73	Probable source USR pattern
Dly	mni	14042		J3E	24	35	3kHz wide rad teleph
Dly	mni	14058+		A2	24	68	Helschreiber fax China??
010591	1030_	14070	VBX	A1A		21	Traffic out
1705	1401_	14070.5	VRQ	A1A		5	Very rough sig off freq???
0205	0830+	14075	VRQ	A1A		52	Also VPC on 14075 & 085
010591	1030+	14085	NPO	A1A		18	4 & 5 letter group
This bracket of stations also includes KFB, NZB, VPC, all sending similar tfc							
2204	0905	14140	UMS	F1B	18	17	Also A1A, 250Hz shift
0605	1215	14145		F1B		4	1000Hz shift 3rd register USR
040591	0800+	14170/1	UMS	F1B	18	20	Mxd modes 250Hz
0505	1035_	14172	3UGE	A1A			also XPLW
0205	0850+	14185		F1B	24	15	RTTY 250Hz
040591	0900	14200	VMO	A1A			VLQ de VMO
2904	0900	14202		F1B		16	
Dly	mni	14211	3SM	multi		57	RTTY mode 250Hz shift
200491	0045	14217	UMS	multi	24	20	5 fig blocks cypher 3kHz wide
0605+	mni	14218		F1B		5	RTTY 50Hz
2004	0840+	14220		multi		10	RTTY 250Hz/USR pattern
150591	0529	14270	???	A3E		1	Radio France International
News headings in French and current affairs 2nd harmonic of 7135MHz????							
0305	1245	18072		A3E		3	DL/BY language lessons!!!
2004	0055	21032	UMS	F1B+	24	31	Moscow Naval USR/ID in A1A
030591	0358	21115	CQ5	A1A		21	
0805+	0930+	21150	-	R7B		7	4-21kHz wide
190491	0600+	21283	UMS	F1B+	24	31	250Hz/A1A 3rd register USR
190491	0605	21347+		fax	24	37	Wx fax not directed to VK
0505+	0738+	21355	R Mosc	A3E		5	Rad Moscow in Russian
1705	1130	21435		A3E??			I make a guess at mode????
1005	0746	28478		F1B		7	RTTY (not enough info)
0705	0922	28980		A3E		6	Russian language talk USR

My thanks for this summary to VKs 2PS, 2COX, 2EYI, 3DVT, 3KCD, 4BG, 4AKX, 4BHJ, 4BTW, 4BXC, 4CAS, 5GZ, 5TL, 6RO, 6XW & 7RH.
Many logs have insufficient info to be included in this summary; please take more time to ascertain callsigns from broadcasting stations. Thank you. ar

Hamads

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*Copy typed or in block letters to PO Box 300, Caulfield South, Vic 3162, by the deadline as indicated on page 1 of each issue.
*QTHR means address is correct as set out in the WIA current Call Book.

*WIA policy recommends that Hamads include the serial number of all equipment offered for sale.
*Please enclose a self addressed stamped envelope if an acknowledgement is required that the Hamad has been received.
Ordinary Hamads submitted from members who are deemed to be in general electronics retail and wholesale distributive trades should be certified as referring only to private articles not being re—sold for merchandising purposes.
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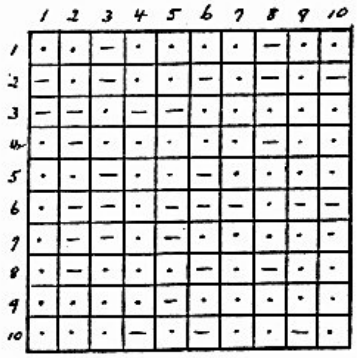
State: .....

Not for publication: ❑ Miscellaneous ❑ For Sale ❑ Wanted

Name: ..... Call Sign: ..... Address: .....

Solution to Morseword No 52 P 49



Solution to Morseword No 53

Across: 1 feel; 2 cart; 3 manse; 4 rife; 5 errs; 6 poem; 7 weds; 8 rind; 9 sense; 10 skite.

Down: 1 pies; 2 image; 3 gaze; 4 fist; 5 fake; 6 rank; 7 hens; 8 mail; 9 hast; 10 lah.

TYPESETTING : Magazine Graphics, PO Box 72, Caulfield Sth, 3162, Ph: 528 1033

PRINTING: Industrial Printing, Richmond

MAIL DISTRIBUTION: R L Polk & Co Pty Ltd, PO Box 140, Collingwood, Vic. 3066, Tel:(03) 417 5161

ADVERTISERS INDEX

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Fill out the following form and send to:

The Membership Secretary
Wireless Institute of Australia
PO Box 300
Caulfield South, Vic 3162

I wish to obtain further information about the WIA.

Mr, Mrs, Miss, Ms: .....

.....

Call Sign (if applicable): .....

Address: .....

.....

.....

State and Postcode: .....

WIA Slow Morse Transmissions

VK2BWI nightly at 0930 UTC on 3550 kHz

VK2RCW Continuous on 3699 kHz and 144.950 MHz 5 wpm, 8 wpm, 12 wpm

VK3RCW Continuous on 144.950 MHz 5 wpm, 10 wpm

VK4WIT Monday at 0930 UTC on 3535 kHz

VK4WCH Wednesday at 0930 UTC on 3535 kHz

VK5AWI Nightly at 1030 UTC on 3550 kHz

VK6RAP Nightly at 2000 local on 146.700 MHz

VK6WIA Nightly (except Saturday) at 1200UTC on 3.555 MHz

VK6WIA Nightly (except Saturday) at 1200 UTC on 3.555 Mhz

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The following items are available from your Division's Bookshop
(see the WIA Division Directory on page 3 for the address of your Division

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